TECHNOLOGY DEPT.

JULY, 1956

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RUBBER WORLD

NOW IN ITS 67th YEAR

HEVEA CORAL

BILL BROTHERS

UBLICATION

THE PROPERTIES AND APPLICATIONS OF CORAL RUBBER

By Glen Alliger *et al*, page 549

There are reasons why an antioxidant is widely used for over 25 years

NEOZONE* A

A Time-Proven Antioxidant for Dark-Colored Products

Effective at all levels up to 20 phr in natural rubber.
No other known antioxidant can be used in such high amounts without blooming.
High solubility and effectiveness in all elastomers.
Melts at mixing temperatures—disperses perfectly.

• • •

Use as much or as little as the product requires and obtain trouble-free protection.

• • •

Use it in any elastomer for assured protection.

*"NEOZONE" IS DU PONT'S REGISTERED TRADEMARK FOR ITS RUBBER ANTIOXIDANT

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Elastomers Division
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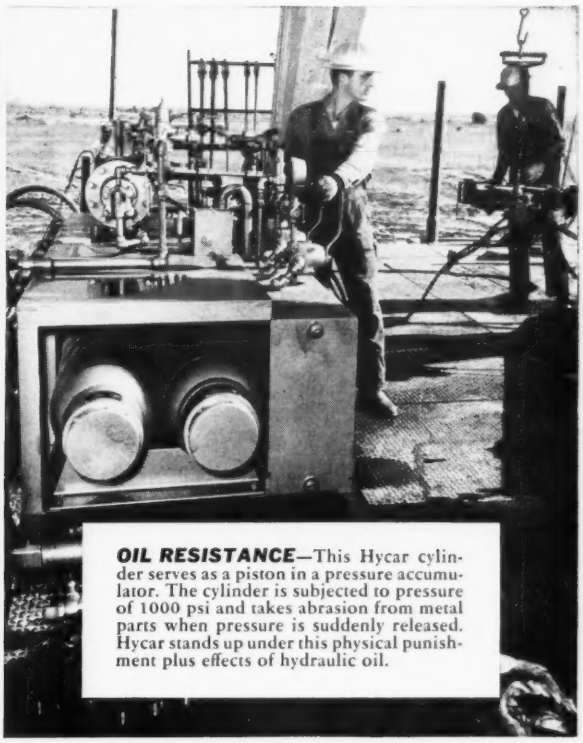
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

RUBBER WORLD, July, 1956, Vol. 134, No. 4. Published monthly by BILL BROTHERS PUBLISHING CORP. Office of Publication, 1309 Noble Street, Philadelphia, Pa., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States $5.00 per year; Canada, $6.00. All other countries $7.00. Single Copies 50 cents. Address Mail to N. Y. Office.

News about

B.F.Goodrich Chemical *raw materials*

RESILIENCE—A Hycar blanket fits around this cylinder that presses paper down on a printing press surface. The Hycar must "give" under pressure, yet snap back through millions of impressions, retaining original thickness within a thousandth of an inch.



OIL RESISTANCE—This Hycar cylinder serves as a piston in a pressure accumulator. The cylinder is subjected to pressure of 1000 psi and takes abrasion from metal parts when pressure is suddenly released. Hycar stands up under this physical punishment plus effects of hydraulic oil.

LONG WEAR—These roller skate wheels prove Hycar's exceptional wearing qualities. Wheels maintain perfect balance and roundness, keep a good grip on the surface. Hycar is easily molded for products like this, retains high dimensional stability.

How HYCAR AMERICAN RUBBER meets many requirements

HYCAR can be compounded to fit the needs of specific jobs like these. Hycar is resistant to oil, most solvents and chemicals, aging, and abrasion. Send for booklet listing properties of standard materials. Write Dept. ES-7, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
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Hycar
Reg. U. S. Pat. Off.
American Rubber

B.F.Goodrich GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

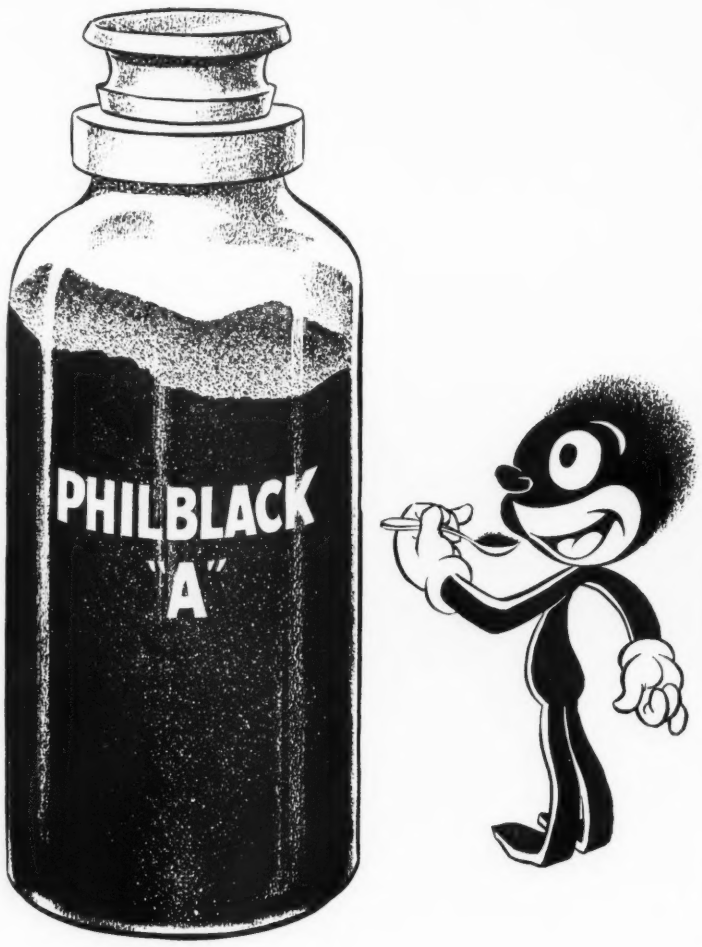
PHILBLACK*A... just what the doctor ordered for "nerve" troubles!

Jumpy nerve? Relax with Philblack A! This easy processing and fast extruding black has a wonderful way with rubber, especially synthetic rubber! It calms nerve troubles. It produces more homogeneous mixtures by penetrating and breaking down rubber particles.

Besides speeding up processing time, Philblack A gives you more accurate moldings by improving mold flow. And Philblack A stocks are noted for their smooth, easy extrusion characteristics.

Philblack A was the first of the four famous Philblacks. The other Philblacks, O, I, and E, offer different . . . and equally important . . . advantages to the rubber compounder. Consult your Philblack technical representative about the Philblack which can help you best.

*A Trademark



Meet the Philblacks! DISCOVER WHAT THEY'LL DO FOR YOU!

A **Philblack A FEF Fast Extrusion Furnace Black**
Ideal for smooth tubing, accurate molding, satiny finish. Mixes easily. High, hot tensile. Disperses heat. Non-staining.

O **Philblack O HAF High Abrasion Furnace Black**
For long, durable life. Good electrical conductivity. Excellent flex. Fine dispersion.

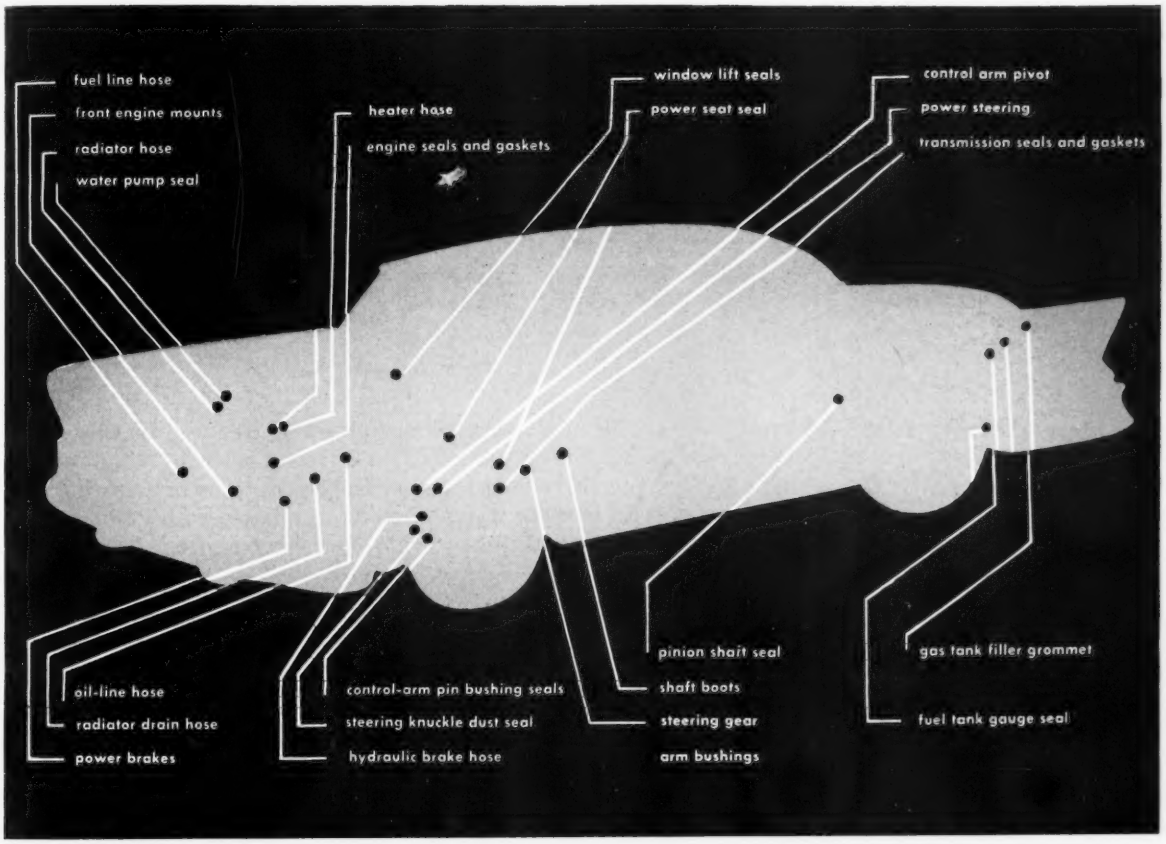
I **Philblack I ISAF Intermediate Super Abrasion Furnace Black**
Superior abrasion resistance at moderate cost. Very high resistance to cuts and cracks. More tread miles at high speeds.

E **Philblack E SAF Super Abrasion Furnace Black**
Toughest black on the market. Extreme abrasion resistance. Withstands aging, cracking, cutting and chipping.

Phillips 66

PHILLIPS CHEMICAL COMPANY, Rubber Chemicals Division, 318 Water St., Akron 8, Ohio. Export Sales: 80 Broadway, New York 5, N. Y.
West Coast: Harwick Standard Chemical Company, Los Angeles, California.

Naugatuck Paracril



Paracril...the oil-resistant, nitrile rubber suited to many automotive applications!

Spelled-out above are just a few applications for Paracril, Naugatuck's butadiene-acrylonitrile copolymer. Unequalled in resistance to oils, fuels and organic esters, aromatic hydrocarbons, chlorinated organic liquids and most hydraulic fluids, the Paracrils provide greater tensile strength with increased dimensional stability, high abrasive resistance, unusual low-temperature flexibility, and excellent resistance to oxidation.

Paracril® stocks are fully compatible with most other rubbers and plastic resins... can be calendered, extruded, or molded by standard rubber forming methods... are easily dissolved in solvents to make low-viscosity solutions for cement applications.

Why not write to us on your company letterhead for application and test data today?

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

US RUBBER

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Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

to make the shoe f

Pictured at right are three approaches to meeting the need for oil-resistant shoe soles. First (left) is a sole based on CHEMIGUM—first and finest of the nitrile rubbers. Second (center) is a sole based on a blend of CHEMIGUM and PLIOFLEX—general purpose styrene rubber—reinforced with PLIOLITE S-6B, a high styrene resin. And third (right) is a sole based on a popular "oil-resistant" rubber.

From these photographs and the accompanying data, it is evident that CHEMIGUM is the key to successfully combating the effects of oil and related products. CHEMIGUM alone offers the maximum in oil-resistance, without sacrifice of physical properties. CHEMIGUM plus PLIOFLEX and PLIOLITE S-6B offers a range of compounds to meet the most specific demands on costs or properties.

Extensive tests show that CHEMIGUM/PLIOFLEX/PLIOLITE shoe soles are markedly superior in *combined oil-resistance and wearing properties* to others compounded from individual rubbers or blends. They also exhibit excellent low temperature properties plus a low specific gravity for a lighter-weight sole *at a very attractive pound-volume cost.*

Moreover, since it tends to soften under mastication, CHEMIGUM or its blends with PLIOFLEX are easy to mix. Other processing advantages include a lightweight bale, safe scorch values and excellent bin aging.

Why not find out how easily and exactly CHEMIGUM or CHEMIGUM/PLIOFLEX/PLIOLITE blends can fit your need for shoe soles or any of the many products requiring resistance to oil. You can, simply by writing for details and the latest *Tech Book Bulletins* to: Goodyear, Chemical Division, Akron 16, Ohio.

CHEMICAL GOODYEAR DIVISION

RUBBER & RUBBER CHEMICALS DEPARTMENT

CHEMIGUM • PLIOFLEX • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS

High Polymer Resins, Rubbers, Latices and Related Chemicals for the Process Industries

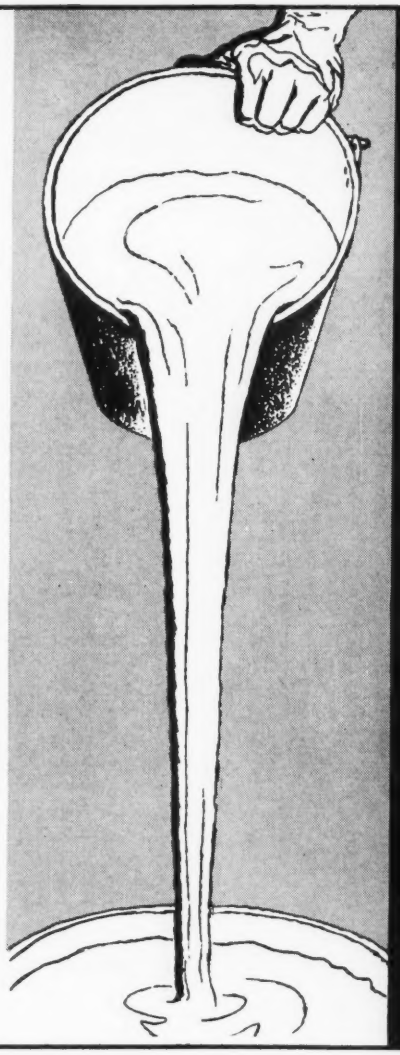
Chemigum, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

efit the need

COMPARISON OF PROPERTIES — OIL-RESISTANT SHOE SOLES

	① 100 Parts CHEMIGUM	② 70 Parts CHEMIGUM, 30 Parts PLIOFLEX	③ 100 Parts RUBBER "A"
Tensile/Elongation, psi/%	3380/510	2450/560	2760/690
Hardness, Shore A	88	89	86
Abrasion Resistance Bureau of Standards, %	102.8	81.7	66.8
Ross Flex, Aged 24 Hours @ 212° F., Flexed Under ASTM #1 Oil, Flexes/Rating	64,300/10.0	125,000/6.5	125,000/7.5
Volume Swell, 7 Days @ RT + 70 Hours @ 158° F. in ASTM #3 Oil, %	3.7	35.2	66.9

It's inert to hydrolysis and bacterial action...



the thickener that pours easily!

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A SYNTHETIC POLYMER

You're likely to find an ideal combination of advantages when you thicken latex with Modicol VD. For this synthetic polymer gives uniform high viscosity . . . smooth and gel-free . . . even at very low concentrations.

Modicol VD pours easily, saves you time, guesswork and material waste.

Modicol VD not only eliminates creaming and separation but also improves mechanical stability of the latex emulsions. These are all typical advantages. Why not find out how Modicol VD can help improve your own processing. Simply send today for bulletin MVD 33 to Nopco Chemical Company, Harrison, N. J.

Advantages of MODICOL VD

Easy to handle
High uniform viscosity at low concentrations
Smooth gel-free type of viscosity
Stable in alkaline fluids
Unaffected by bacteria or fungi

NOPCO

PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif.
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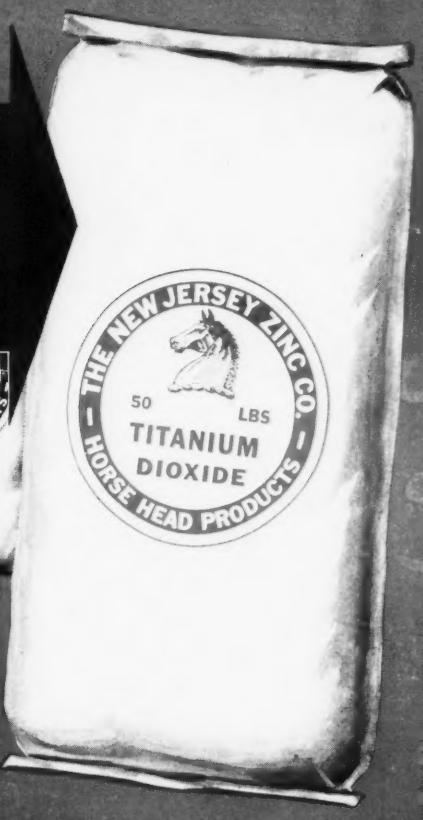
D July,

And Now...

HORSE HEAD TITANIUM DIOXIDE



Here's your newest ally for highest brightness and hiding power —HORSE HEAD TITANIUM DIOXIDE.

Now, for the first time, you can build Horse Head reliability and uniformity into your products with titanium dioxide—even as so many have done with our zinc pigments for over one hundred years.

From THE MOST COMPLETE LINE...

You will find that HORSE HEAD TITANIUM DIOXIDE adheres to the same high standards that have influenced more companies to use Horse Head pigments than any other brand.

Now you can obtain from a single source the most complete line of white pigments—the Horse Head line—titanium dioxides, leaded and lead-free zinc oxides, and zinc sulfides.

HORSE HEAD TITANIUM DIOXIDE is available in a variety of anatase and rutile grades as described in the Horse Head Titanium Dioxide Selection Chart. We'll be glad to send you a copy upon request.

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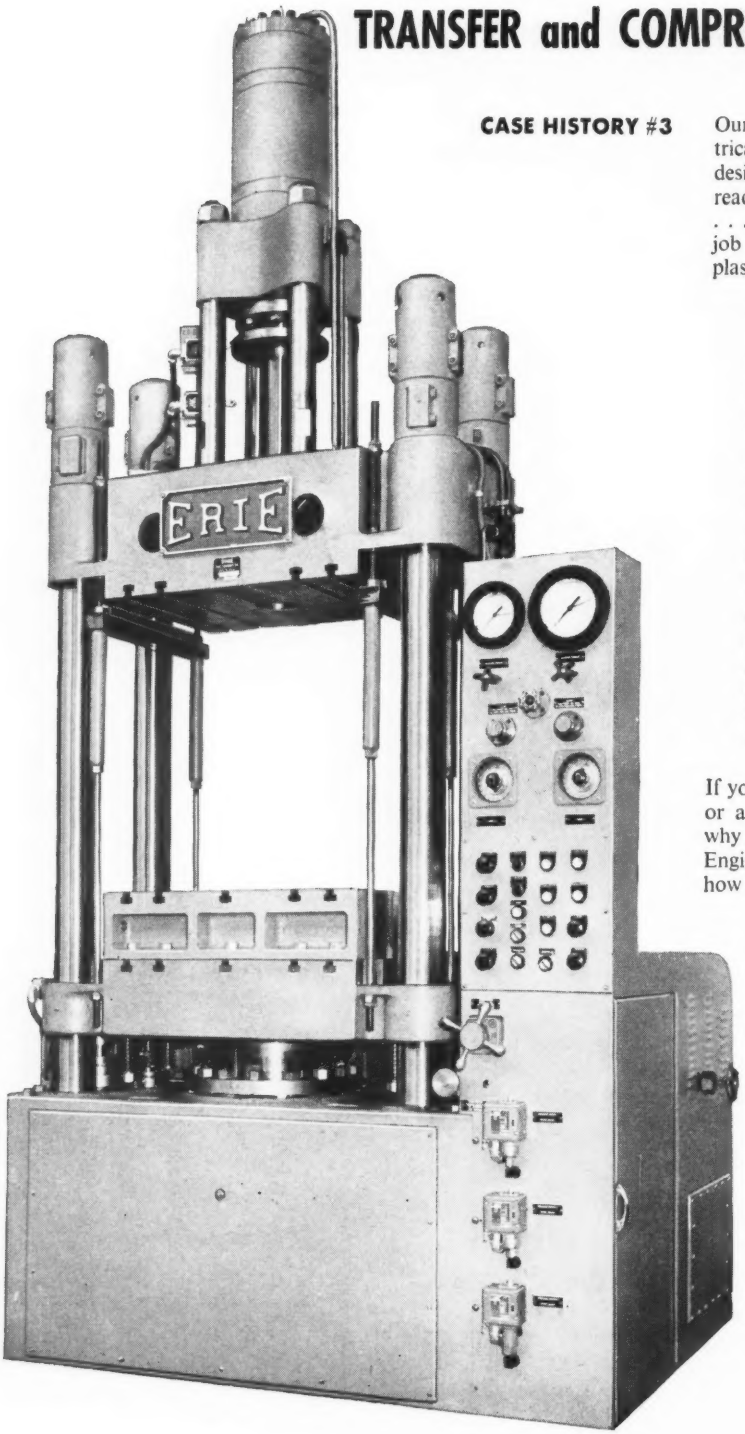
ERIE PRESS OF THE MONTH

TRANSFER and COMPRESSION MOLDING PRESS



CASE HISTORY #3

Our customer, a prominent manufacturer of electrical machinery and components, asked us to design and build a flexible press which could be readily used for compression and transfer molding . . . a press to handle—at a profit—almost every job which might come into their rubber and plastic shop.

- Erie Foundry engineers designed this 200 ton self-contained transfer and compression molding press with controls for four different automatic cycles—two compression molding (with and without degassing), and two transfer molding cycles. In one transfer cycle, the transfer ram opens before the main ram. The transfer ram follows the main ram down and then returns during the second transfer molding automatic cycle. This press can also be set up and operated manually by means of an inching control.

- Both the 200-ton main ram and the 55-ton transfer cylinder have separate timers. Fast advance and return speeds are provided by two double acting cylinders. In addition, there are two knock-out cylinders on the bolster, and a mechanical knock-out for the top mold.

If you are thinking of a flexible, all-purpose press, or a compression press for a specific operation, why not call in the Erie Foundry Hydraulic Press Engineer? He will apply Erie Foundry's vast know-how to the design and building of your press.

ERIE

SINCE 1895

Hydraulic Press Division

ERIE FOUNDRY CO.

ERIE, PA.

From a modern day Aladdin's lamp

MUEHLSTEIN'S MODULENE*

VIRGIN POLYETHYLENE

...available for extrusion and injection molding

Modulene has outstanding low temperature flexibility and toughness, superior chemical inertness, freedom from taste, odor and toxicity, excellent dielectric properties, low specific gravity (.92) and low water vapor permeability.

Modulene's superior properties can offer you production savings and improved products design.

Inquire also about new Super Modulene, the amazing, new High Modulus Polyethylene* that offers greater heat tolerance, toughness, rigidity and chemical resistance.

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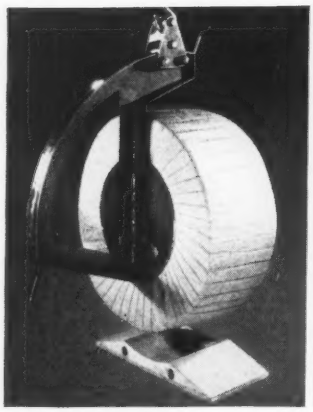
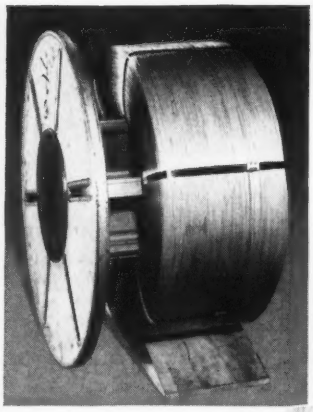
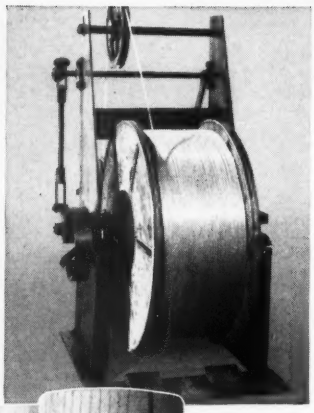
* *Manufactured by Koppers Company, Inc.*







Top Left—*Pneumatic coil lifter* positioning reelless coil over saddle block prior to removal of paper wrap and assembly of let-off reel.*

Center—*Partly assembled pneumatic let-off reel.* Note provision for removal of steel strapping and easy assembly of reel to coil on saddle block.*

Top Right—*Completely assembled reel with bead wire coil mounted on conventional let-off stand.*

*Patents Pending

ESTIMATE YOUR SAVINGS

...with National-Standard reelless bead wire methods!

THIS development combines the completely reelless shipment, storage and handling of bead wire with a new type of wire let-off reel for tire production. Here are some of the direct advantages:

- Shipping tare cut to a fraction . . . and *no reels to return.*
- Completely wrapped coils for better and prolonged wire protection.
- Less than half the time and effort formerly required for unloading and in-and-out-of-storage handling.
- Storage capacity multiplied by easy, safe stacking of palletized coils.
- Palletized storage with complete accessibility permits ideal inventory rotation.
- Improved production. Pneumatic let-off reels (easily, quickly applied to coils at point of use) assure uniform flange pressure throughout pay-off, eliminating tangling, breaking and down-time.

These are a few high points of this new development. Look into it. We'll gladly give you complete details. Just let us know.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape
ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
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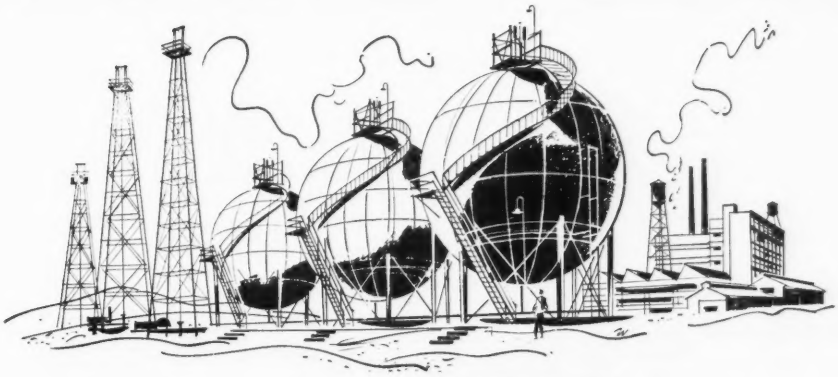
Special Machinery for Metal Decorating
WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

An assured major source of synthetic rubber



TEXUS

TEXAS–U.S. CHEMICAL COMPANY

from raw materials to application

When The Texas Company and United States Rubber joined forces in acquiring from the government one of the great synthetic rubber plants, together with a joint ownership in the world's largest butadiene plant, they brought together a unique combination of experiences. From TEXUS (Texas-U.S. Chemical Company), industry is assured a major source of basic ingredients with the most advanced knowledge in the production and processing of synthetic rubber.

Source, alone, is not enough. Long experience in manufacturing the finished product is not enough. You need both, and in this respect TEXUS is unique, for TEXUS has both.

Depend on TEXUS for your needs in quality controlled synthetic rubbers. Its product Synpol is a standard for uniformity in the butadiene-styrene types.

Sales Agent: Naugatuck Chemical, Naugatuck, Conn.

SYNPOL Synthetic Rubbers available now:

Each type duplicates former GR-S designations except as noted below.

Hot Types	Remarks
SYNPOL 1000	Staining
SYNPOL 1001	Slightly Staining
SYNPOL 1002	Staining
SYNPOL 1006	Non-Staining
SYNPOL 1007	Staining
SYNPOL 1009	Non-Staining
SYNPOL 1012	Non-Staining
SYNPOL 1013	Non-Staining
*SYNPOL 1061	Non-Staining
Cold Types	
SYNPOL 1500	Staining
*SYNPOL 1551	Non-Staining
Cold Types—Oil Masterbatch	
SYNPOL 1703	Non-Staining
SYNPOL 1707	Non-Staining
SYNPOL 1708	Non-Staining
SYNPOL 1711	Staining

*two new Synpol grades

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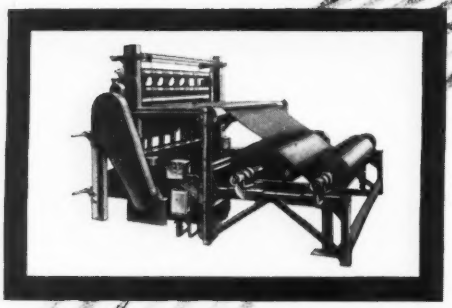
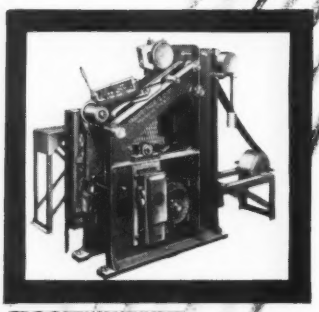
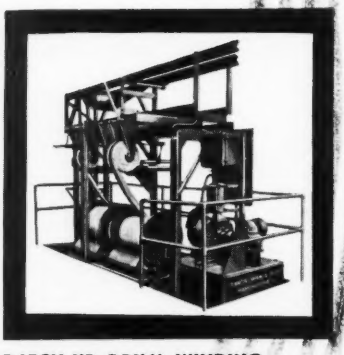


FABRIC SLITTING
at 450 yards an hour

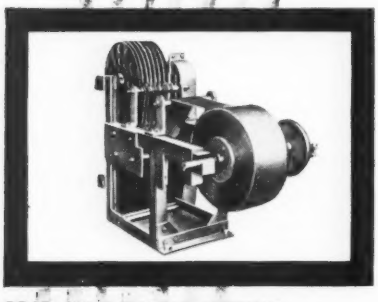
complete wire-bead CYCLE TYRES in one fast operation



SPOOL WRAPPING
to supply 4 Monoband machines

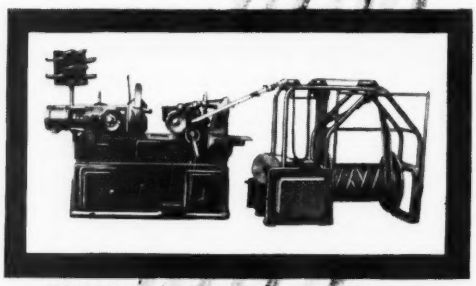


BATCH-UP DRUM WINDING
for continuous production

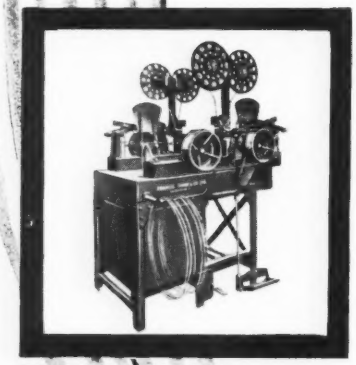


BEAD WIRE FABRIC SLITTING
for 1,650 tyres an hour

SHAW MONOBAND PROCESS



and **MONOBAND COVER PRODUCTION**
of up to 80 covers an hour



BEAD WIRE COVERING
of 300 single wires an hour

with the SHAW-SUMMIT vulcanising press

SHAW

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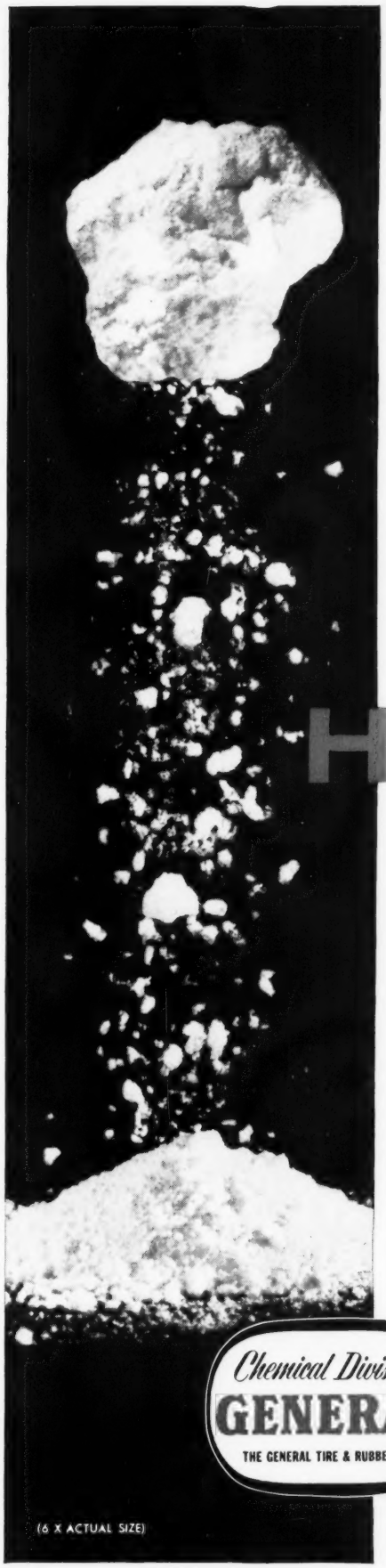

GET BETTER DISPERSION WITH HYSTRON®

the easy-processing high-styrene resin

Get a sample of Hystron and try this simple "crumble" test . . . see for yourself how each friable crumb disintegrates at the slightest pressure, or upon contact with a mixing batch. Then try the same test with any other granular-type high-styrene resin . . . the comparison will prove Hystron's easy disintegration and will show why faster and better dispersion can be expected. Hystron offers all the mixing advantages of a powder, contains no hard particles, and is extremely low-dusting because of its comparatively low percentage of fines.

Get high reinforcement, modulus and hardness in shoe soles, luggage, floor tile, athletic goods and many other rubber products with the new, easy-processing, high-styrene resin, Hystron. For samples and literature, write to Harwick Standard Chemical Company, Akron, Boston, Trenton, Chicago, or Albertville, (Alabama).

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HYSTRON

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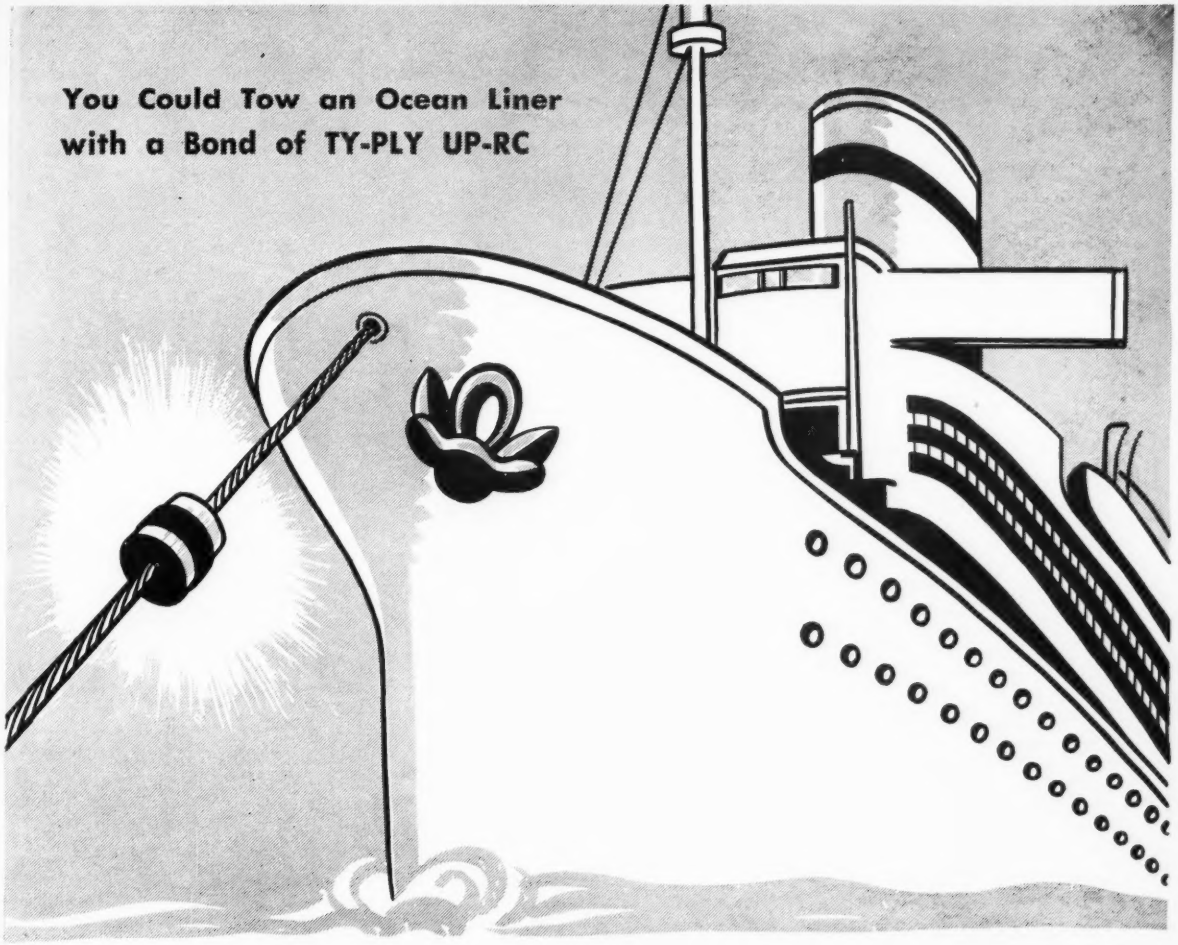
Rutile types of TITANOX white titanium dioxide pigments are universally acceptable for most types of plastics—whether extruded, molded, sheet, or film-coated. For white and light tinted stocks, TITANOX-RA provides maximum whiteness, brightness and opacity. For heavily loaded stocks where the high opacity of "pure" titanium dioxide is not needed, TITANOX-RCHT or TITANOX-C-50 may be used.

But whatever the use, no other whitening agent gives plastic products the color and sparkle—the eye-catching appearance—that TITANOX does. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Atlanta 5; Boston 6; Chicago 3; Cleveland 15; Houston 2; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 14, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

Titanium Pigment Corporation is a subsidiary of National Lead Company

3646-A



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UP/RC

TWO-COAT ADHESIVE SYSTEM

for bonding Natural Rubber and GR-S Compounds

For good dynamic performance there is nothing like TY-PLY UP-RC . . . A two-coat adhesive system for vulcanized bonding of natural Rubber and GR-S compounds to metals. Very effective for all types of compounds with a wide range of curing conditions and end requirements. Excellent shelf and working stability, high bond strength and insensitive to weather conditions.

TY-PLY will adhere most vulcanizable rubber compounds to almost any clean metal surface

TY-PLY "UP-BC"

Two-coat Adhesive System for Bonding of Butyl Rubbers.

TY-PLY "Q" or "3640"

the single coat adhesive for bonding Natural and GR-S compounds.

TY-PLY "BN"

for bonding N-types

TY-PLY "S"

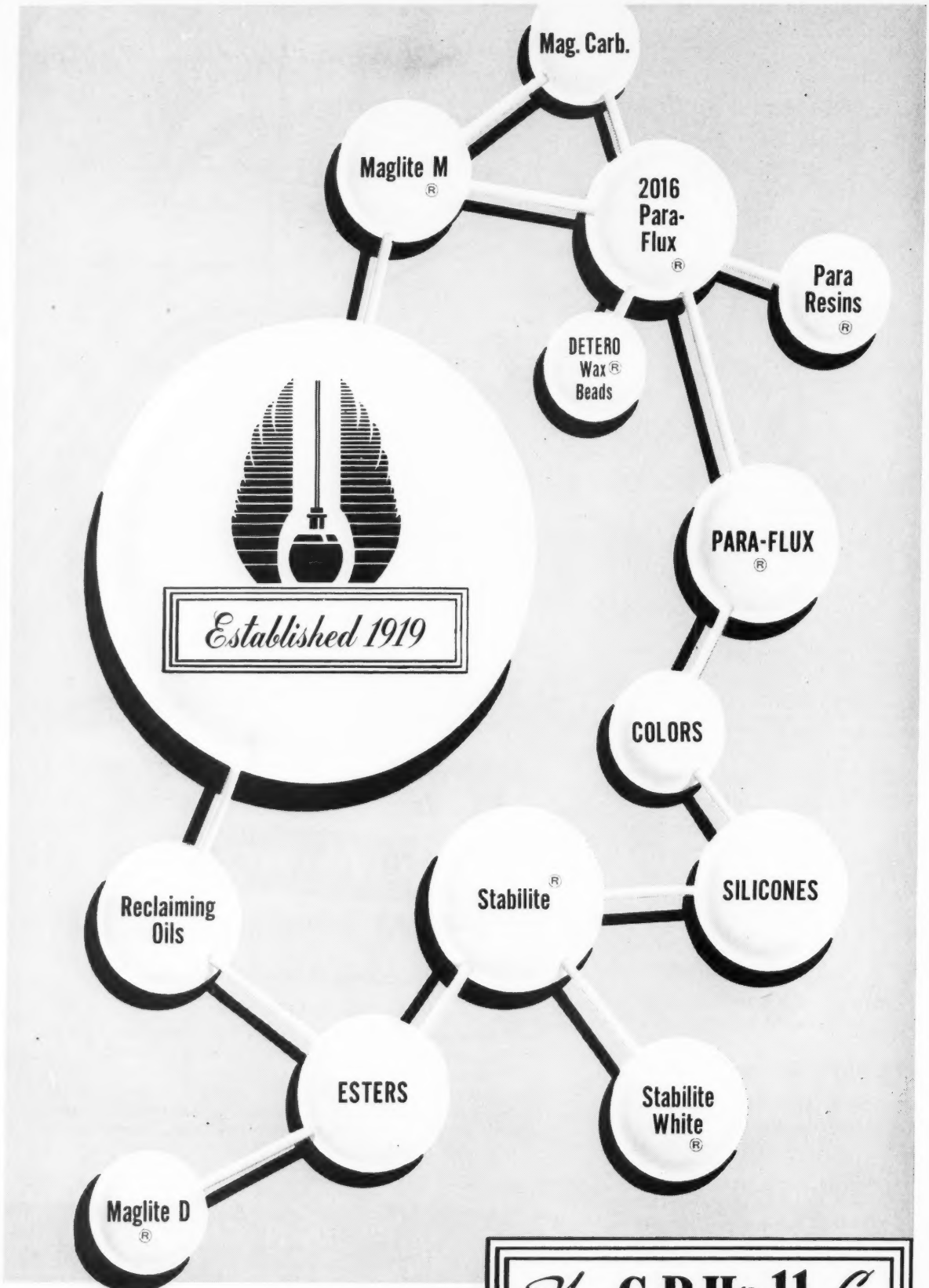
for bonding Neoprene

MARBON CHEMICAL

Division of BORG-WARNER

GARY, INDIANA

TY-PLY has stood the test of time . . . since '39



Akron, Ohio • Chicago, Ill. • Memphis, Tenn.
Los Angeles, Calif. • Newark, N. J.

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

Key to a brighter future!

The attractive vinyl flooring pictured above is just one of many products for which the future has been brightened by CHEMIGUM N-6B – a new, amazingly light-colored, nonstaining, nondiscoloring nitrile, or oil-resistant rubber.

In vinyl flooring of the past, nitrile rubber was used as a "permanent" plasticizer to impart lasting flexibility and resilience to the normally rigid resin. But since the rubber tended to discolor with age and exposure to sunlight, the highly desired light, bright colors were difficult to achieve and retain.

In vinyl flooring of the future, CHEMIGUM N-6B will be the plasticizer because: 1. Its original color is extremely light 2. It exhibits outstanding resistance to color change 3. It possesses all the processing and performance advantages for which all the CHEMIGUM rubbers are well known.

In addition to its use as a plasticizer for vinyl resins, CHEMIGUM N-6B has application in any molded or extruded rubber product requiring oil-resistance plus light color. For full details, write to: Goodyear, Chemical Division, Dept S-9418, Akron 16, Ohio.

CHEMICAL GOODYEAR DIVISION

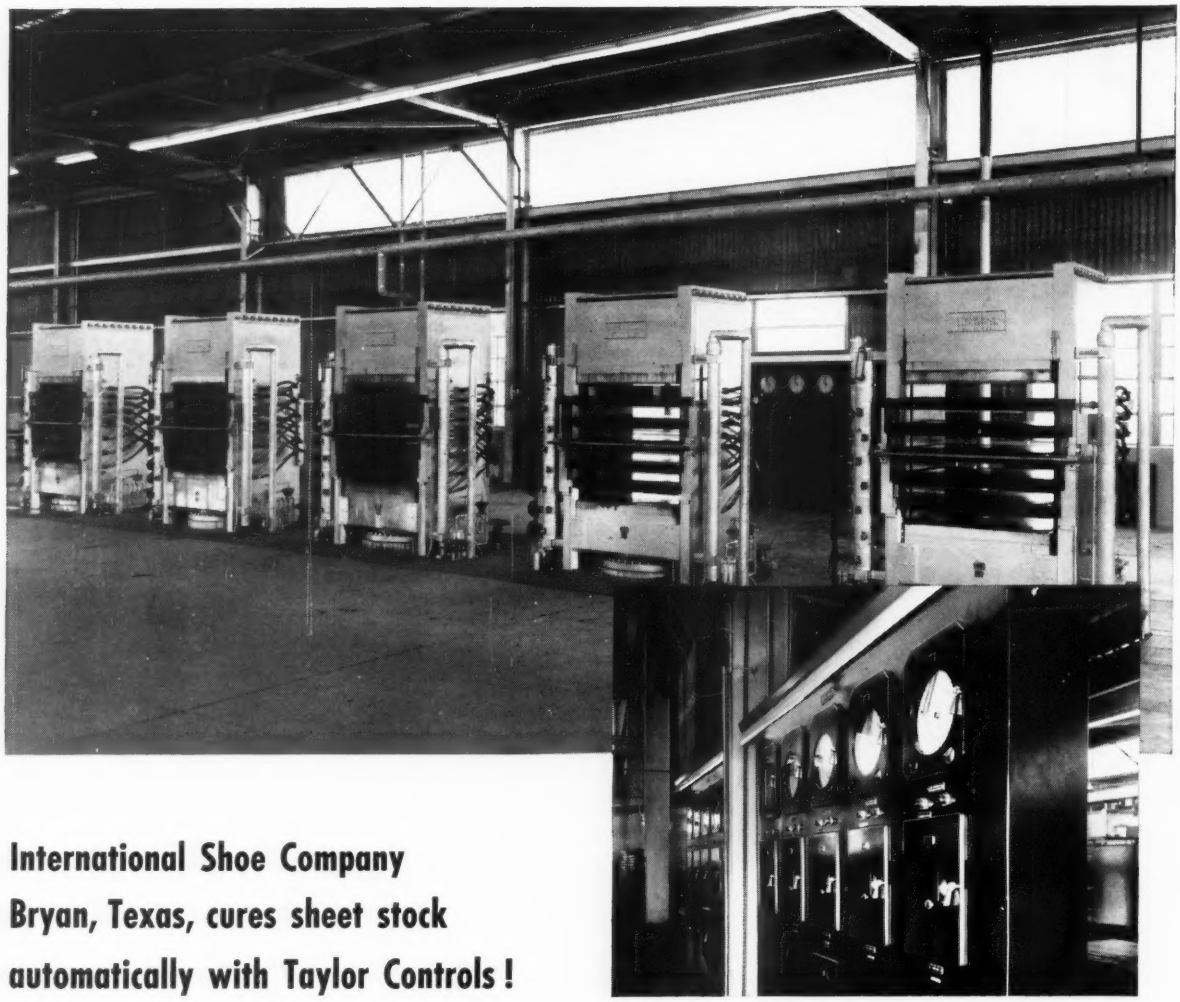
RUBBER & RUBBER CHEMICALS DEPARTMENT

Chemigum, Plioflex, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

CHEMIGUM • PLIOFLEX • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS

High Polymer Resins, Rubbers, Latices and Related Chemicals for the Process Industries

SOLE CONTROL



International Shoe Company Bryan, Texas, cures sheet stock automatically with Taylor Controls!

TAYLOR controls on their platen presses provide many benefits for the International Shoe Company.

1. **They protect International's fine name by insuring a uniformly high quality in their sheet stock.**
2. **Press performance is 100% predictable.**
3. **Since the entire sequence and duration of the cure is automatically controlled, production schedules can be set up so that the minimum number of operators can be used for the maximum number of presses. Skilled operators are thus released for other duties.**

The larger photograph above illustrates the battery of French Oil Mill Machinery Co. 42″ x 42″ platen presses, with one of the Taylor instrument panels in the background. Inset picture gives a close-up view of the control panel for ten 30″ x 30″ presses. The FULSCOPE* Controllers at top regulate platen temperature, while the FLEX-O-TIMER* Time Cycle Controllers automatically operate the presses, from closing them through bumping, timing the cure, operating the valves in proper sequence and opening of the presses.

*Reg. U.S. Pat. Off.

Note the "off-the-press" location of all instruments on central panels. This gives more convenient access to working areas and enables operators to check performance at a central point. Better "housekeeping" and care of equipment also results.

To find out how you can profitably put Taylor to work in your plant, call your Taylor Field Engineer, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

"My Customer Found Cracks In Our 'New' Tires!"

Sales are lost, product acceptance damaged, when ozone cracking shows up even on new products.

You can give your product dependable protection from ozone cracking, from the day it's made till the day it's discarded even under the most extreme conditions, with Universal's high potency rubber antiozidants, UOP 288 and UOP 88.

To tires, or any other rubber product, natural or synthetic, these Universal antiozidants provide complete protection under both static and dynamic exposure.

To be sure your product presents the quality appearance you built into it, when it comes face to face with a potential customer, let us recommend the correct UOP antiozidant formulation to give it complete protection from ozone cracking.

UOP 88® and 288 TRADEMARK

RUBBER ANTIOZIDANTS

UOP®

PRODUCTS DEPARTMENT

UNIVERSAL OIL PRODUCTS COMPANY

30 ALGONQUIN ROAD
DES PLAINES, ILLINOIS, U. S. A.

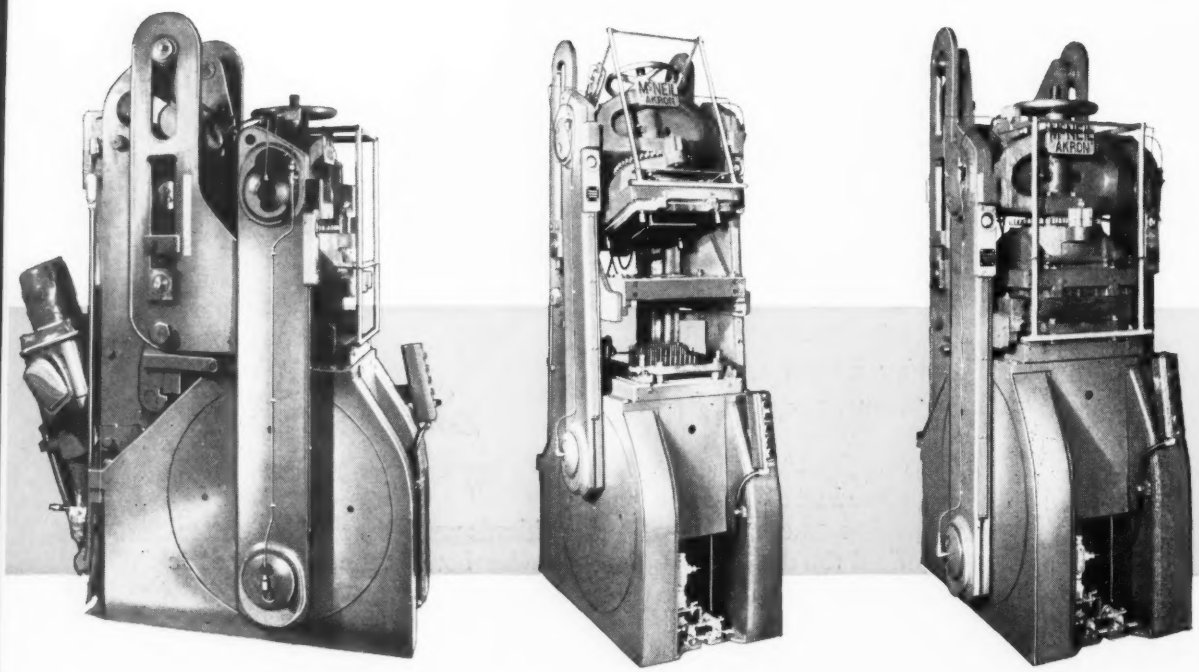
Any Way You Look At It...

THE NEW

McNEIL-AKRON MODEL 300

PROVIDES AUTOMATIC, MECHANICAL HANDLING

to speed mechanical goods production & slash mechanical goods cost



You've been needing it . . . Here it is — the new McNEIL-AKRON Model 300—a faster-operating, cost-cutting 18″ x 18″ Mechanical Goods Press. It's a new BIG BROTHER to our popular, speedy 10″ x 16″ BANTAM. It's specially designed for quick transfer molding of small, close-tolerance products. It's another McNeil FIRST! THE "300" IS AUTOMATIC, FAST, EFFICIENT — A high production unit that handles 2-, 3- and 4-plate molds automatically and speedily. It is equipped with an automatic, adjustable knockout mechanism that provides greater latitude to mold design. Hand work and mold maintenance costs are held to a minimum.

THE "300" IS VERSATILE — Can produce a wide variety of jobs within the limits of its Zero to 300,000 lb. total platen pressure. Electrically heated platens give any workable temperature desired.

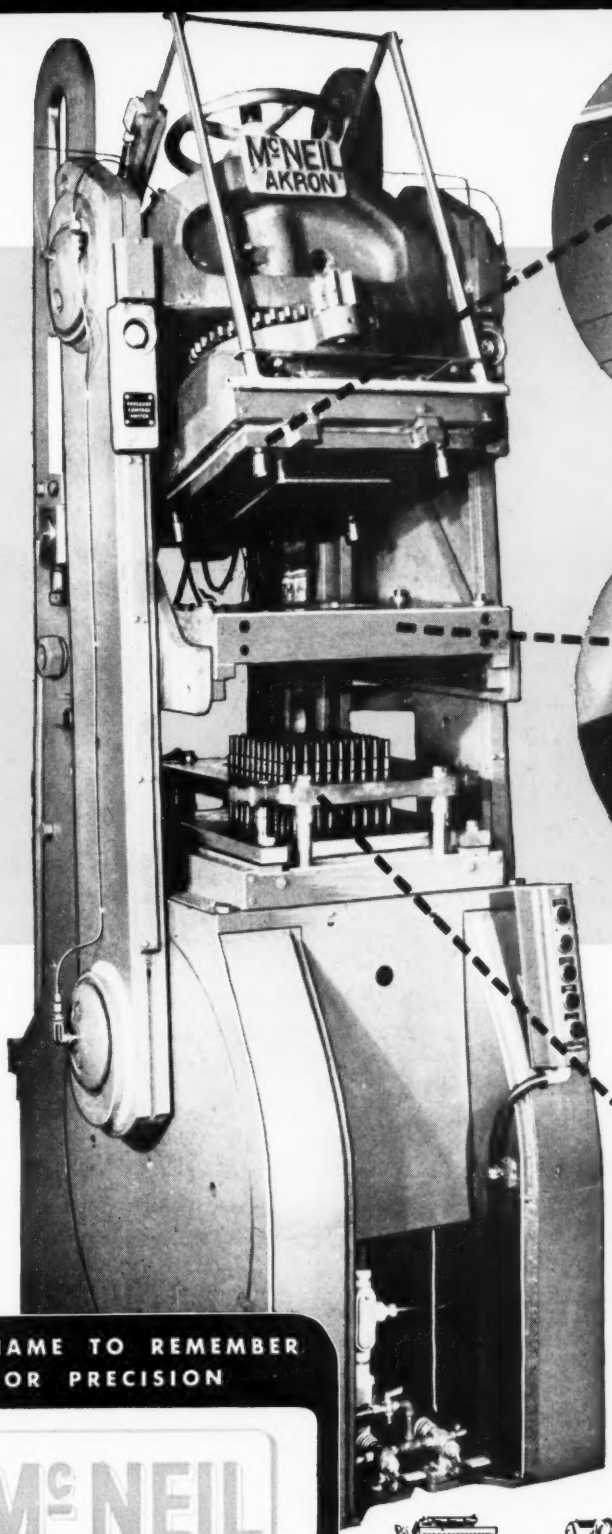
THE "300" IS DEPENDABLE — Built to McNeil PRECISION and quality standards, it is as reliable and maintenance-free as only a McNEIL-AKRON Press can be!

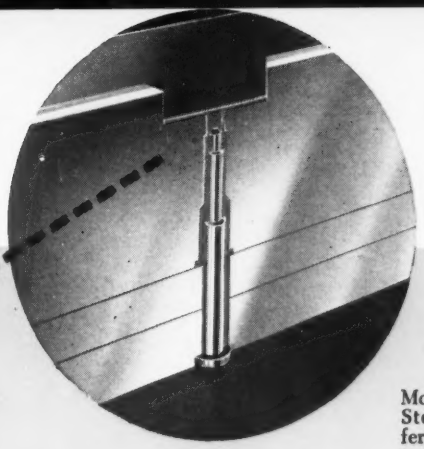
THE "300" IS COMPACT — Measures only 2′11½″ x 5′9½″ x 7′5¾″ closed or 8′4¾″ open. Requires only 18 sq. ft. of floor space.

THE "300" IS A PROFIT-PRODUCER — Economical to buy, own and operate, it will quickly pay for itself in profitable, headache-free production.

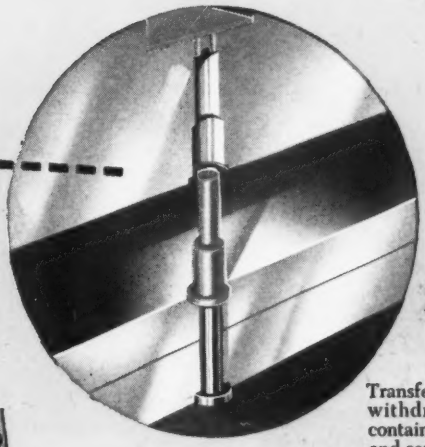
COMPLETELY MECHANICAL OPERATION

The mold illustrated is a 4-plate transfer mold consisting of plunger plate; well and cavity plate; stripper plate; core plate. Machined to very close tolerances from heat-treated steel, this mold will operate over long production runs at a minimum of maintenance or down time because it is completely mechanically operated by the McNeil "300".

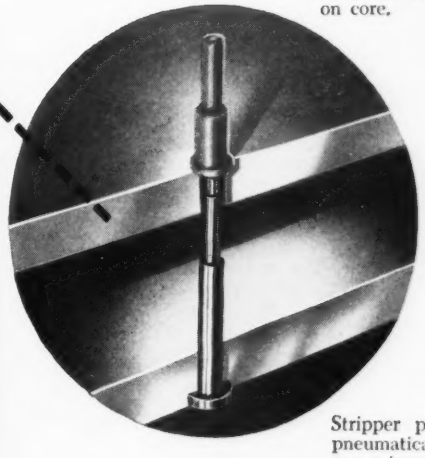




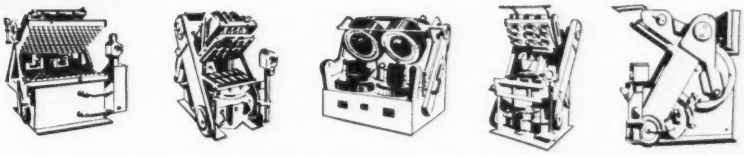
Mold completely closed. Stock has been transferred from transfer well into cavity.



Transfer plunger has been withdrawn. Mold plate containing transfer well and cavities is being lifted by side lifting plates provided on the McNeil "300". Product remains on core.



Stripper plate is raised pneumatically, completely removing product from core.



THE NAME TO REMEMBER FOR PRECISION

McNEIL AKRON

Manufacturers of the World's Finest Rubber Curing Equipment

MANUFACTURING AGENTS: Francis Shaw & Company, Ltd., Manchester, England; Vickers-Ruwolt Proprietary, Ltd., Victoria, Australia; Luigi Pomini, Soc. in Acc. di Luigi e Carlo POMINI fu Egidio e C, Castellanza, Province of Verese, Italy; Etablissements Repiquet, Bobigny (Seine), France; Harburger Eisen Und Bronze-Werke A. G., Hamburg-Harburg, Germany.

WRITE, WIRE OR TELEPHONE TODAY for additional information.

The McNEIL MACHINE & ENGINEERING CO.

96 E. Crosier St. At Sweitzer Ave. **Akron 11, Ohio**

Goodrich-Gulf Chemicals, Inc.

Ameripol...

"the preferred rubber" for exceptional products

MAN-MADE rubber—in the forms available as Ameripol—first proved itself a star performer in tire mileage tests. Thus it is now the preferred tread material on passenger, farm and small truck tires.

That was the starting point. Now Ameripol's use is being constantly broadened . . . specified as "the preferred rubber" in conveyor covers, shoe soles, typewriter rolls, chute linings, and many other end products. To prove the point, Goodrich-Gulf production facilities are being more than doubled to keep pace with demand.

In *your* products, use the preferred rubber . . . Ameripol.

Ameripol RUBBER Reg. U.S. Pat. Off.

Cold Non-Oil Polymers
•
Cold Oil-Extended Polymers
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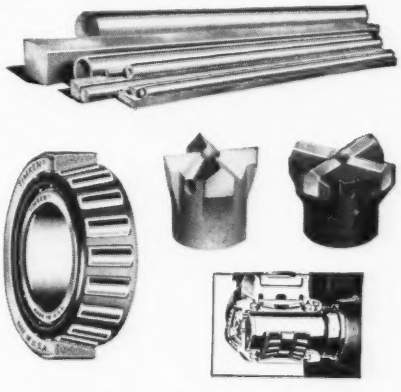
Goodrich-Gulf Chemicals, Inc.
3121 Euclid Avenue • Cleveland 15, Ohio

THE NAME TO REMEMBER FOR QUALITY BACKED BY YEARS OF RESEARCH AND EXPERIENCE

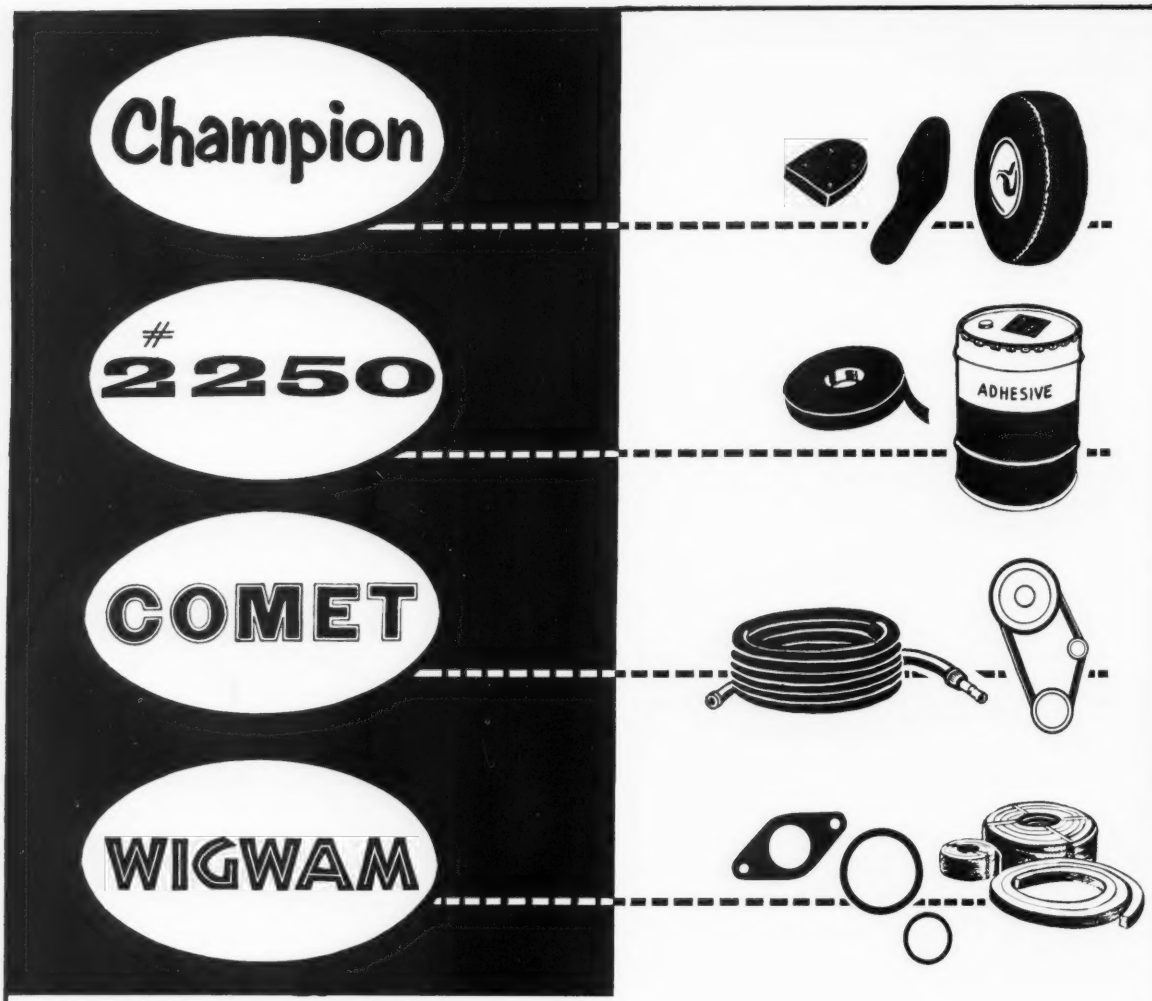
You mean what you say, when you say "TIMKEN"

IF you are content with just any old kind of tapered roller bearing, steel or rock bit, of course you don't specify "Timken". By the same token, when you want highest quality you don't specify anything *but* "Timken". To make sure you get what you want—to safeguard your reputation and ours—we stamp "Timken" on every product we make. When you say "Timken" we know you *mean* a product made by the Timken Company . . . because, as everyone is aware, "Timken" is a trade-mark, not *just a type of product.*

When you purchase tapered roller bearings, alloy steel bars, seamless steel tubing or removable rock bits, always look for this famous legal identification. When you see it, you know there are over 55 years of experience behind it. When you *say* it, you're saying exactly what you mean: "I want the best." The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



TAPERED ROLLER BEARINGS • REMOVABLE ROCK BITS • FINE ALLOY STEELS



Dependable Brands of the

PEQUANOC FAMILY

Among the many well-known reclaims of the Pequanoc Family, there's one for your rubber formula. Whatever your product or specific requirements, Pequanoc Reclaim has a definite place in your production.

Manufacturers of rubber products have long been using Pequanoc Reclaims for many of their standard applications. With these successful applications, has also come low unit costs, as Pequanoc provides maximum economies without sacrificing basic product quality.

Since their start over half a century ago, Pequanoc Rubber Co. has amassed new and better formulas and expert experience in reclaim formulation. To benefit from this vast knowledge, Pequanoc technicians today are ready to assist you on any of your rubber problems. Their personal response is always prompt and courteous.

Pequanoc Rubber Co.

MANUFACTURERS OF RECLAIMED RUBBER **MAIN SALES OFFICE and FACTORY: BUTLER, N. J.**

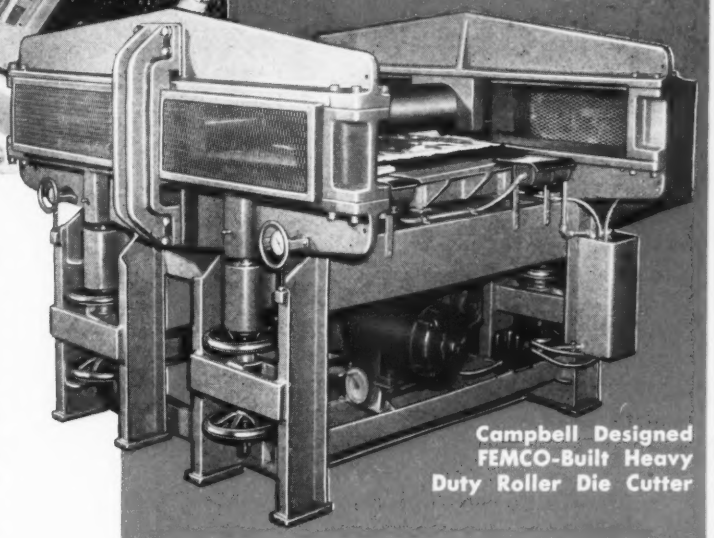
Here's how WOOSTER RUBBER tripled hourly production on KAR-RUGS with a

FEMCO Roller DIE CUTTER

HERE was the problem at Wooster Rubber Company, Wooster, Ohio. Orders for KAR-RUGS were piling up, production had to be increased.

Workers were hand-trimming the tough KAR-RUGS when a FEMCO Roller Die Cutter was installed (see photo at left) to do the trimming. Hourly production immediately more than tripled! Wooster Rubber now has four FEMCO Roller Die Cutters in operation.

What's your cutting or trimming problem? Are you looking for a way to boost production and lower costs? Let a FEMCO representative show you how. Send us a sample of your stock for trial cuts and a full report.



Campbell Designed FEMCO-Built Heavy Duty Roller Die Cutter

★ FEMCO's Roller Die Cutters are available in the following bed sizes: 48″x42″; 60″x36″; 48″x72″; 72″x48″; and 72″x66″. These machines will die-cut Foam Rubber, Polyvinyl, Polyester and Polyurethane stocks; Rubberized Hair; Felt; Textiles; Automotive Rubber Products; Fiberglas; Rubber Coated Stock; Rubberized Cork; Sponge Rubber, etc. Machine uses inexpensive steel rule dies which keep original die costs to a minimum. Write today for full details.

FEMCO'S V-BELT EQUIPMENT Includes Collapsible and Ring Molds, Curing Cages, Autoclave Type Belt Molders, Hydraulic and Manual Manipulators, Vertical and Horizontal Type Measuring and Matching Machines, Notching Machines, the new and improved V-Belt Skiving Machine, and a new and improved V-Belt Collapsible Building Drum. Call us first for this equipment.

The FALLS ENGINEERING AND MACHINE CO.

Established 1917

1734 FRONT ST., CUYAHOGA FALLS, O.

FOR MAXIMUM SUN-CHECKING PROTECTION

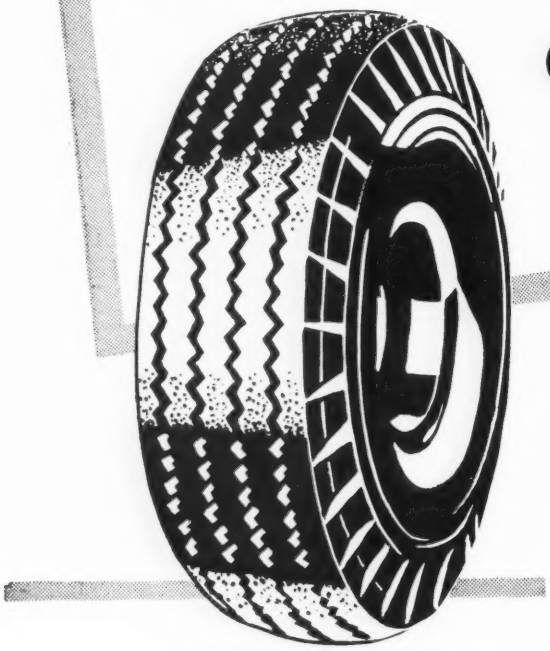
Specify Original Formula

"ANTISUN"*

by

CARY

*Registered Trade Mark



Maximum protection against sun-checking over extended periods can only be guaranteed when a top-notch sun-checking agent is employed.

Cary "Antisun",

formulated of the finest quality ingredients and proven so satisfactory in tire compounding, mechanical goods, insulated wire and cable compounds, is still the same basic formula developed by our President years ago.

- Recommended usage: 2-4% of the weight of the rubber hydrocarbon, depending on the degree of protection desired.
- Unlimited Availability.
- Low Cost.
- Available in convenient chipped or slabbed forms.

Accept no substitute for this time-tested, highest quality product — CARY "ANTISUN".

Cary Chemicals Inc.

P. O. BOX 1128, NEW BRUNSWICK, NEW JERSEY

Laboratory and Plant: RYDERS LANE, MILLTOWN, NEW JERSEY

CHarter 9-8181

CARY CHEMICALS PRODUCTS:

- Vinyl Plasticizers
- Vinyl Compounds
- Sun Checking Waxes
- Gilsonite Compounds
- Reclaiming Oils
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- Tall Oil Esters

Canadian Representative: Lewis Specialties, Ltd., 1179 Decarie Blvd., Montreal 9, Que.

DEMAND AND GET THE FINEST QUALITY!

SPECIFY

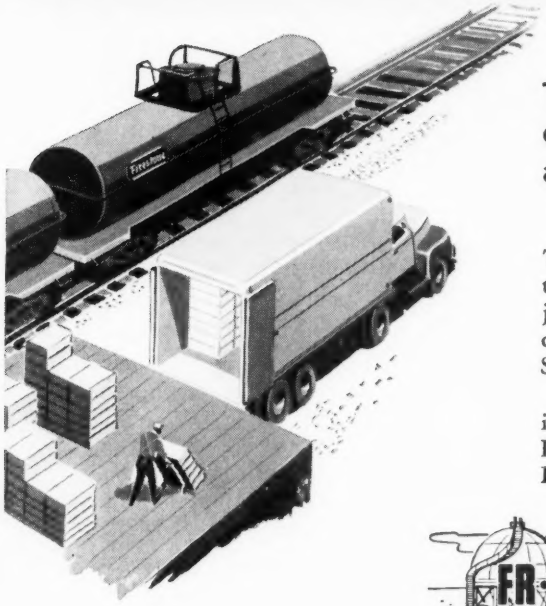
FR-S

(Firestone Rubber-Synthetic)

MADE ONLY BY

Firestone

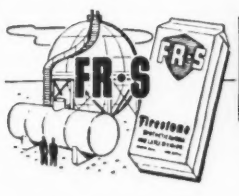
The World's Largest Rubber Producer



This New Standard of Synthetic Rubber is now available in Latex or Dry Rubber

All GR-S used to be the same . . . but things have changed! Today one synthetic stands out above the rest . . . it's FR-S, the general-purpose synthetic made by Firestone. More than just a new name, FR-S is Firestone's new, improved, high quality synthetic that is fast becoming the NEW, HIGH STANDARD for the industry.

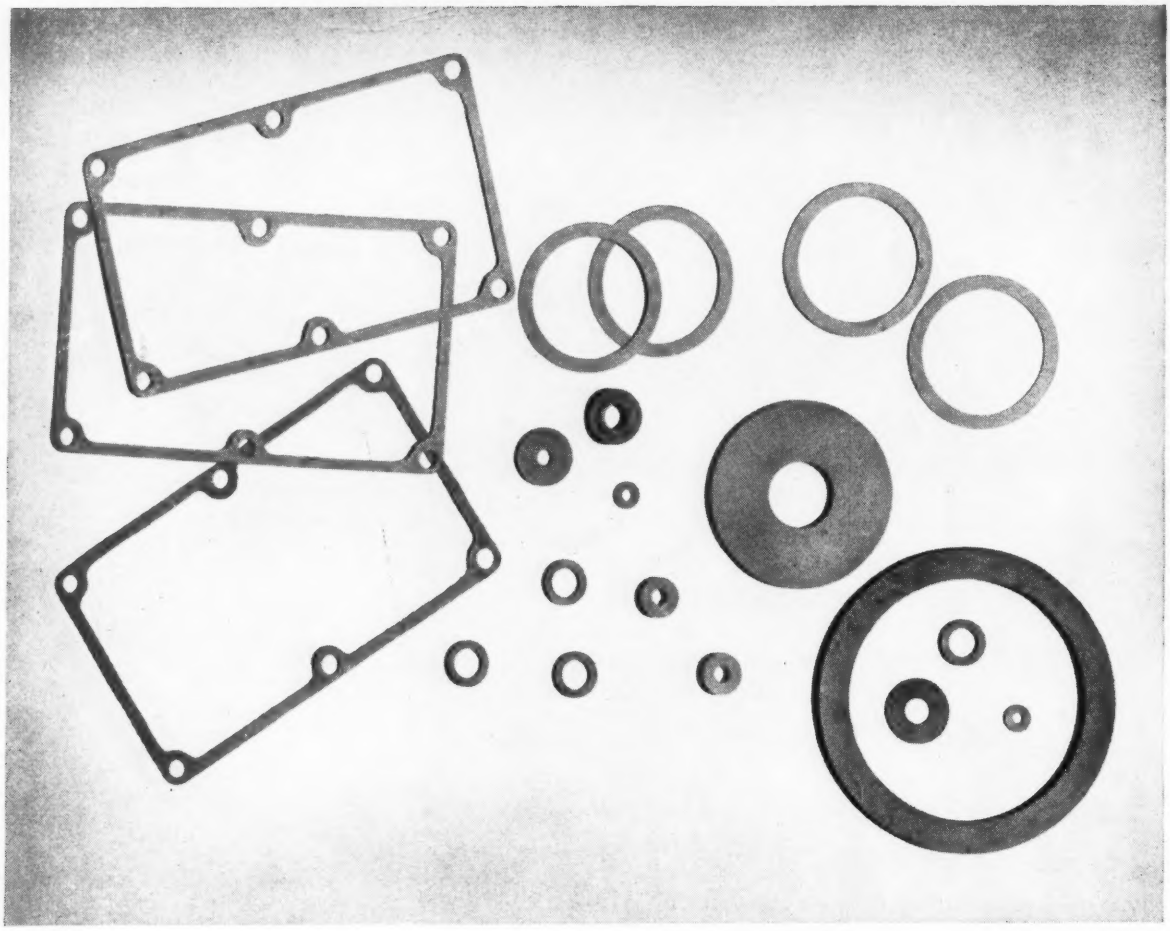
A Firestone Technical man will be glad to give you full information on FR-S and its applications to your product. Phone or write Firestone, Synthetic Rubber and Latex Division, Akron, Ohio.



Firestone

BEST IN RUBBER

Copyright 1956, The Firestone Tire & Rubber Co.



SEALS OR GASKETS—Products that must display outstanding resistance to compression set, perform better when Hercules Di-Cup—the new "cure-all" for polymers—is used as the curing agent.

DI-CUP* FOR TOP RESISTANCE TO COMPRESSION SET

Wherever low compression set, good aging, and good low-temperature properties are required, versatile new Hercules Di-cup (dicumyl peroxide) is the ideal curing agent.

Seals and gaskets, however, are only one of the many categories of products for which this nonsulfur vulcanizing agent has an indicated usefulness.

By producing carbon-to-carbon cross linking, Di-cup can be used to advantage as a curing agent in natural rubber, GR-S, Buna N, silicones, polyethylene and many other polymers.

Economical to use, Di-cup is a stable peroxide of low volatility. In addition to producing vulcanizates having low compression set, good aging, and resistance to solvents and oils, Di-cup enables you to produce whiter white stocks which have good color retention. Silicones in thick cross section cured with Di-cup are free of gas bubbles and acidic by-products.

To learn more about this nonsulfur curing agent, write to Hercules. We'll be glad to send you technical data and information on currently available commercial forms.

** Hercules trademark*

Oxychemicals Division, Naval Stores Department

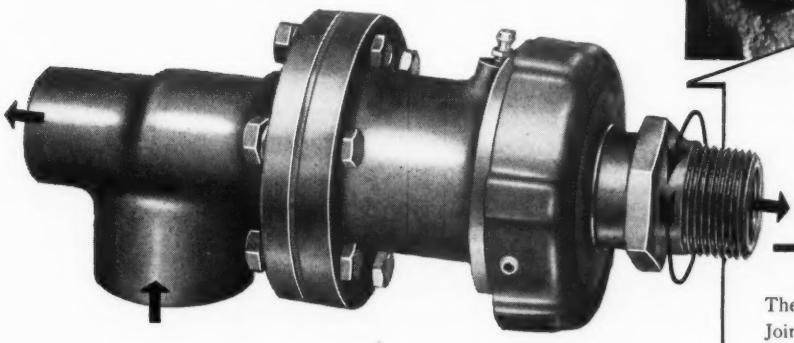
HERCULES POWDER COMPANY

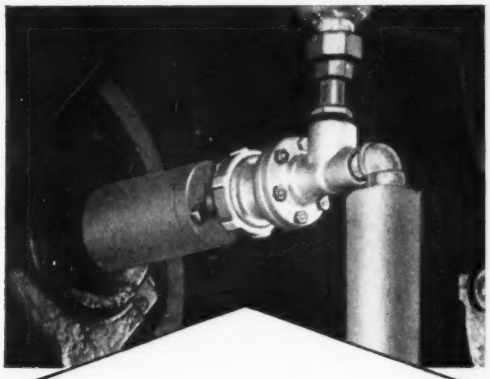
INCORPORATED

914 Market St., Wilmington 99, Del.

N056-2

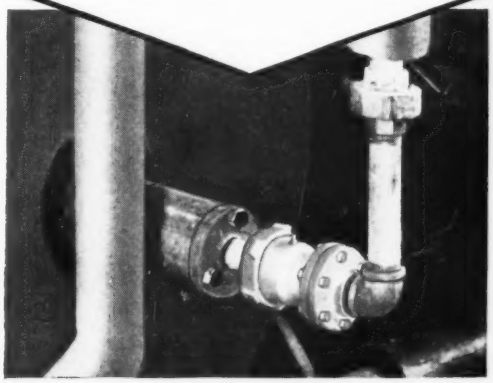
BARCO REVOLVING JOINTS





ON JOB 4 YEARS —NO REPAIRS!

These 1" Barco Type IBR Revolving Joints shown in the accompanying photographs (syphon style, above; single flow style, below) handle 45 psi steam at 20 to 30 RPM and run up to 8 hours per day. Their record of four years' service without repairs under normal conditions of temperature, pressure, and speed shows that BARCO IS YOUR BEST INSURANCE FOR LONG, TROUBLE-FREE SERVICE when you need *rotary steam joints* on rolls, dryers, drums, calendars, and mixers.



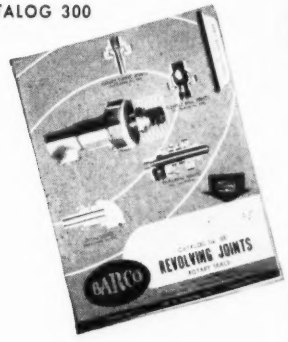
Performance that Pays Dividends IN RUBBER PLANTS

HOW MUCH is it costing you to use less efficient types of rotary joints? . . . For Repair Parts? . . . For "Down Time"? . . . For Extra Power Costs? CHECK YOUR RECORDS—then look at these Barco advantages:

- Trouble-free Performance! Thanks to long lasting "CTR" V-Type Seal Rings—a Barco Development.
- Low Maintenance; No Adjusting. Easy to inspect or service, with no special tools required.
- Low Torque—Cuts Power Costs up to 50%—particularly, at higher pressures.
- Unexcelled Ability to withstand Vibration and Hard Usage.
- Better Temperature Control where steam is used for heating rolls due to better circulation. Barco Joints hold seal standing or running.

You can prove it on your own equipment! Make this test now with new, improved Barco Revolving Joints. Send for complete information and a copy of Catalog No. 300.

• CATALOG 300



SEND FOR INFORMATION

BARCO MANUFACTURING CO.
510H Hough St., Barrington, Illinois

Gentlemen:
Please send me information about Barco Revolving Joints checked at right.

Name_____

Company_____

Address_____

- ☐ Single flow styles. Series 150. Sizes ½" to 2".
- ☐ Syphon Styles. Series 150. Sizes ½" to 2".
- ☐ Revolving syphon styles. Sizes 1" to 2".
- ☐ Series 250 for higher pressures. Sizes 2½" and 3".
- ☐ Heavy duty joints. Sizes up to 5".
- ☐ High speed Type NV joints. Size ¼".

Cut Costs

on any TIRE COMPOUND

(automotive or wheel goods)

with these TIME SAVING . . . PROFIT BUILDING

BUFFALO RECLAIMS

The key to these time and money savings is our patented "RECLAIMATOR PROCESS" which produces quality reclaims in minutes where other conventional processes require hours.

These new reclaims are offering all tire manufacturers GREATER VALUE in THREE WAYS.

1. Higher abrasion resistance, better resilience and lower heat build-up adds HIGHER QUALITY to your product.
2. EASIER and FASTER processing SAVES YOU MONEY on manufacturing costs.
3. Material costs are substantially LOWER with "RECLAIMATOR PROCESS" Reclaims because they will take higher loadings to achieve the SAME RESULTS!

The following list highlights the characteristics of several of our reclaims.

1. FLO-MIX-X: Insures high tensile and abrasion resistance at *reasonable cost*. Also minimizes ozone attack (sidewall cracking).
2. R-400: Non-staining, fast processing for white sidewall tires. "The Reclaim that's Right for Black or White."
3. R-364: Famous for fast extrusion, excellent tack and super-smooth finish.
4. R-650: For EXTREMELY HIGH percentage of NATURAL RUBBER you can't match this one anywhere. In addition, its low Mooney plasticity gives you easier processing and *faster* mixing.

SAMPLES WILL BE SENT ON REQUEST

Always keep reclaims in your formula and always look to US for the BEST. U. S. Rubber Reclaiming Company, Inc., P.O. Box 365, Buffalo 5, N.Y. Trenton Agent: H. M. Royal, Inc., 689 Pennington Avenue, Trenton, N. J.

73 Years Serving the Industry Solely as Reclaimers

U.S. RUBBER RECLAIMING COMPANY, INC.

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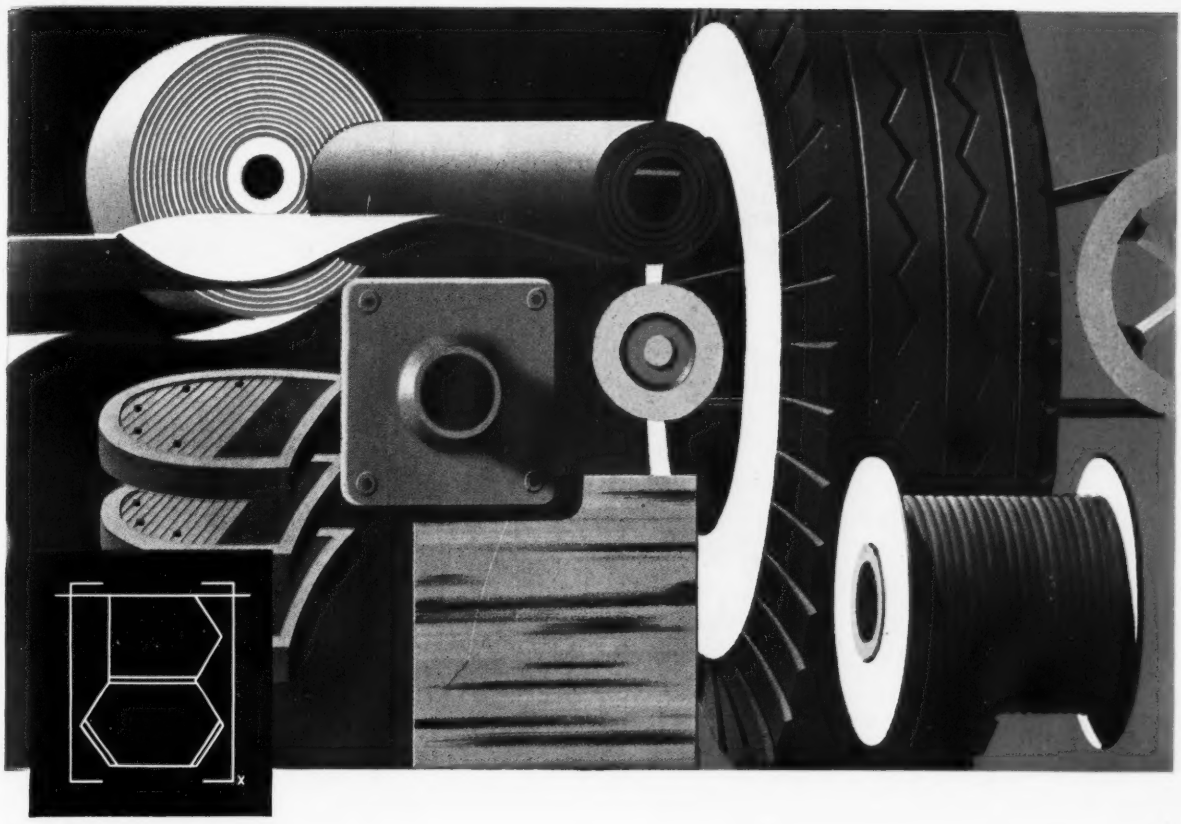

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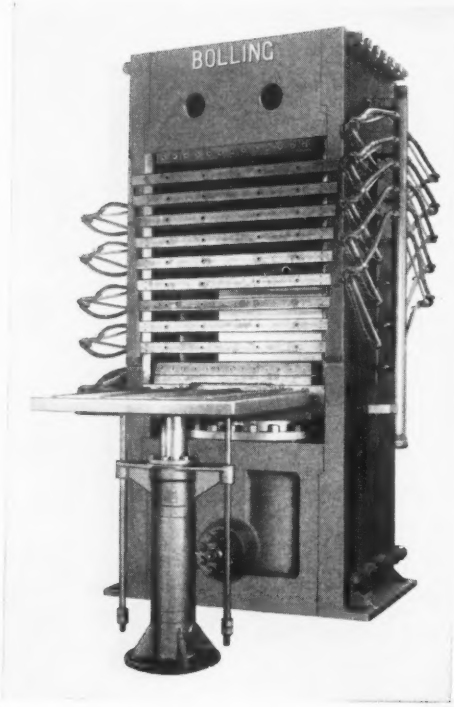

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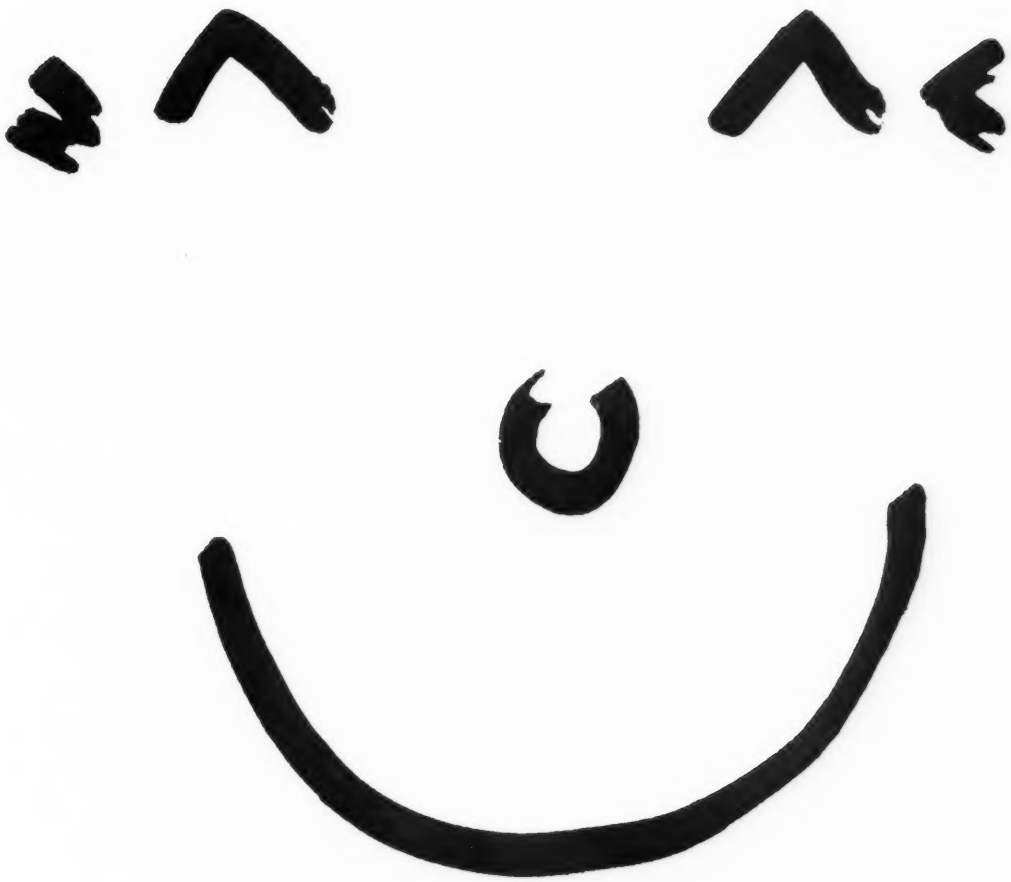

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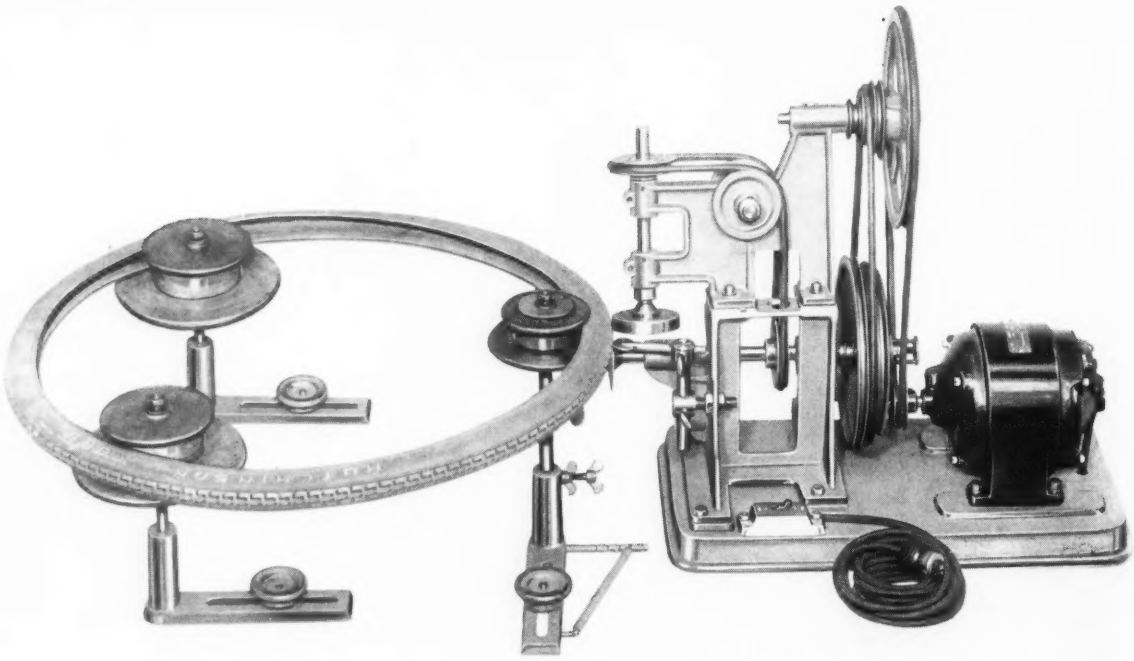

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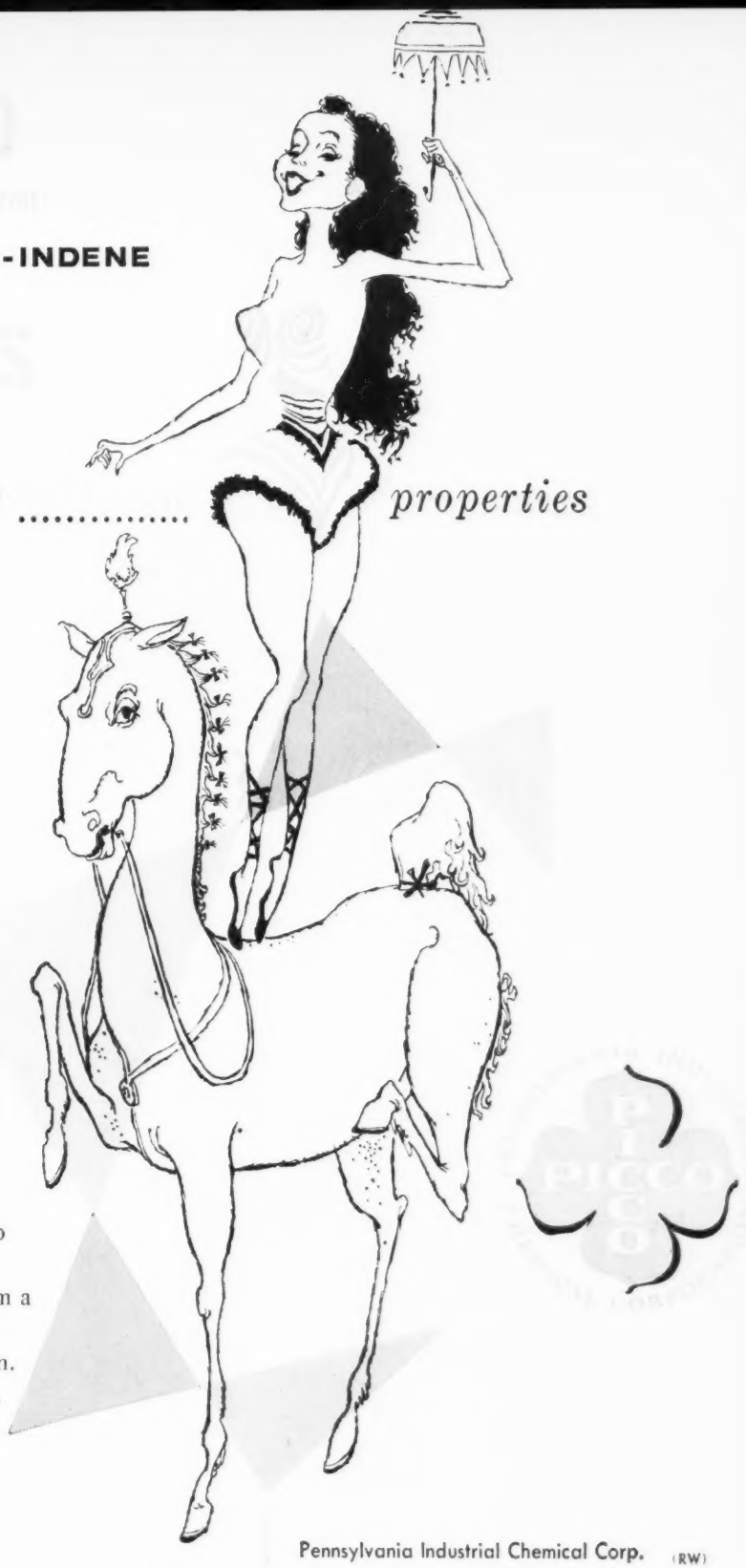

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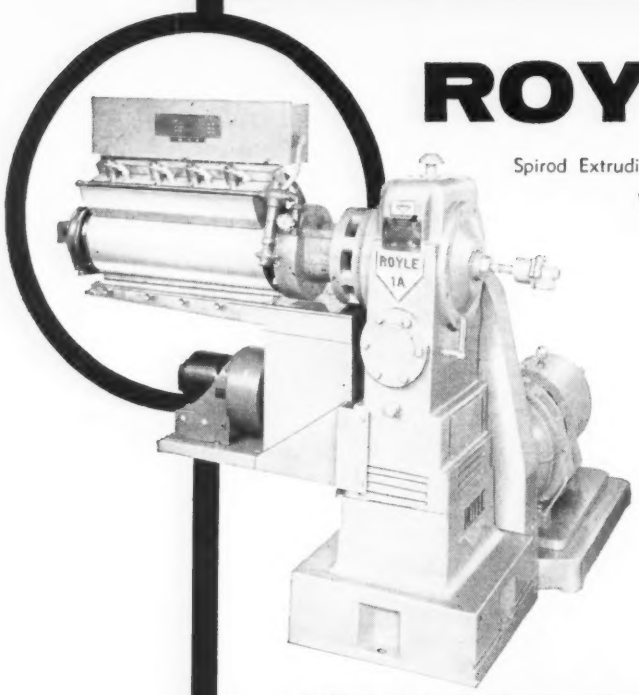

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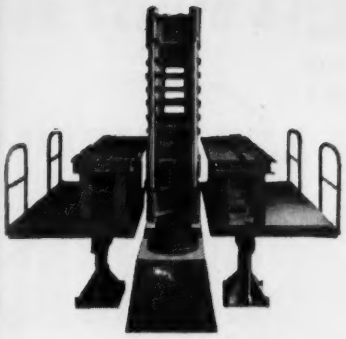

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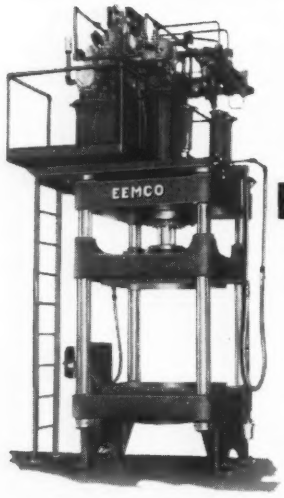

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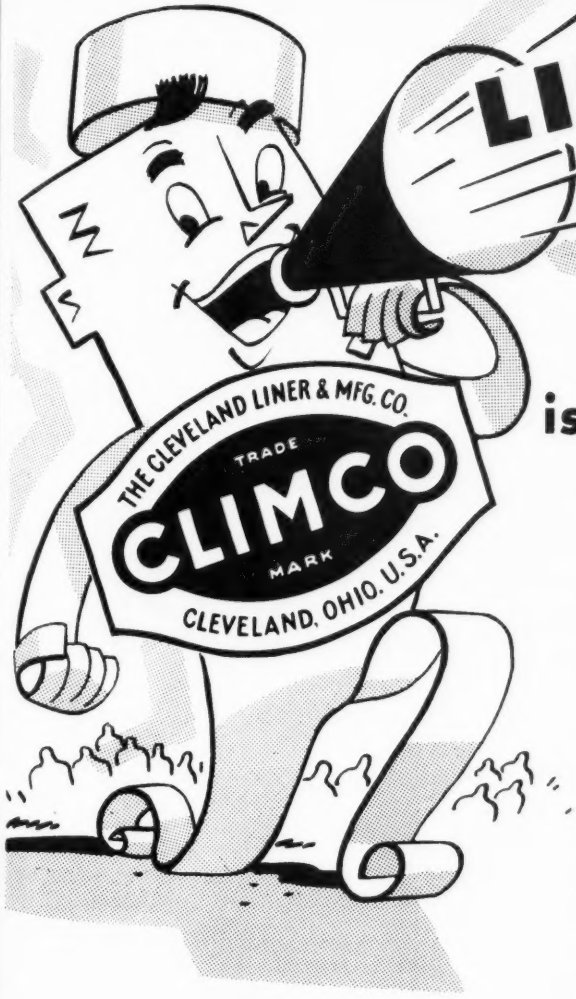

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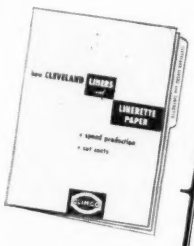

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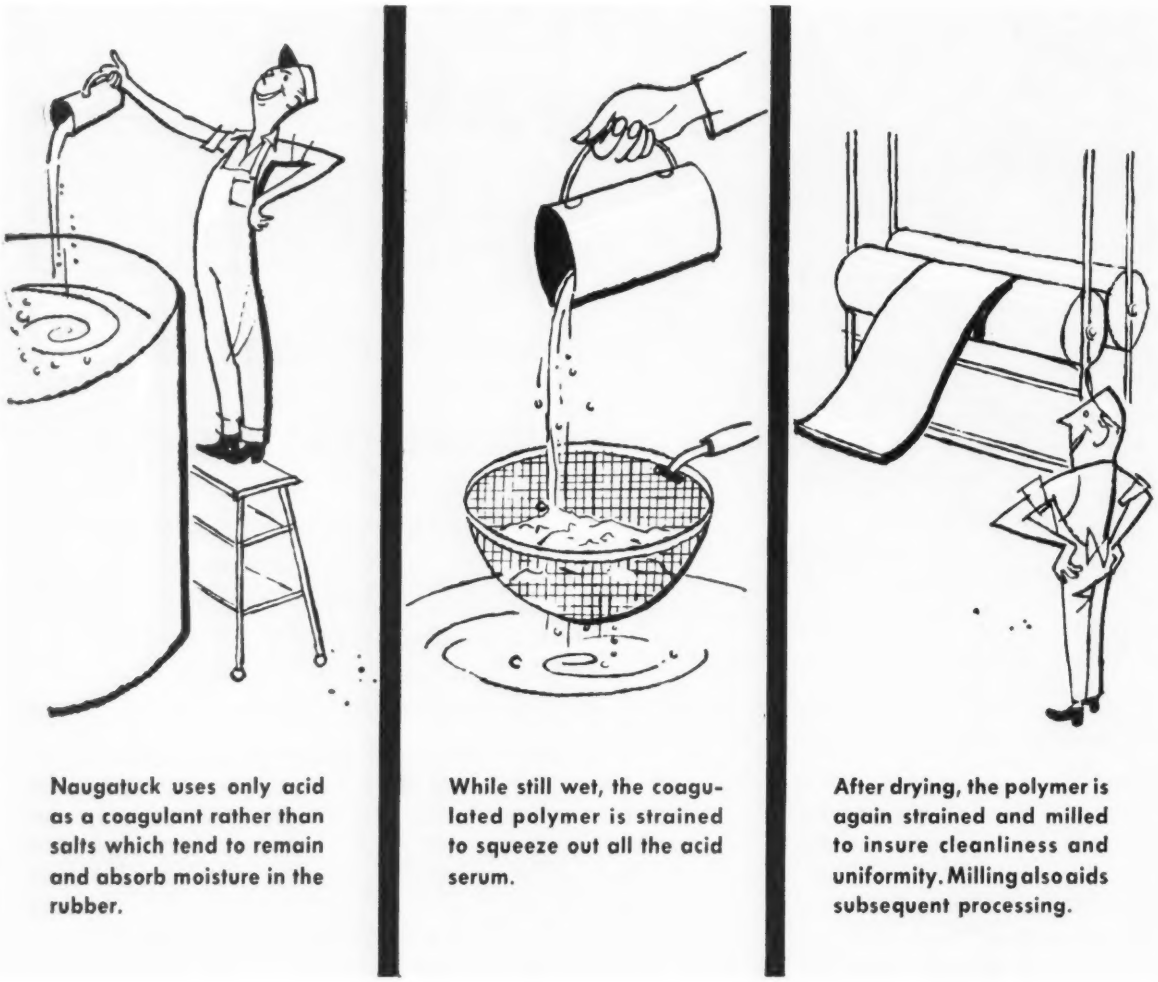

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*Naugatuck's trade name for its specially-processed butadiene-styrene copolymers.

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NAUGAPOL 1018	23.5%†	—	POLYGARD (non-staining)	Wire and cable insulation and mechanical goods. (Crosslinked processing aid).
NAUGAPOL 1019	23.5%	50	POLYGARD (non-staining)	Wire and cable insulation and mechanical goods.
NAUGAPOL 1021	46%	90	P.B.N.A. (staining)	Adhesives and sealants.
NAUGAPOL 1022	23.5%	77	POLYGARD (non-staining)	Adhesives and pressure-sensitive tape.
NAUGAPOL 1023	13%	50	B-L-E (staining)	Wire and cable insulation and mechanical goods for low-temperature service.

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NAUGAPOL 1503	23.5%	52	POLYGARD (non-staining)	Wire and cable insulation and mechanical goods.
NAUGAPOL 1504	12%	52	POLYGARD (non-staining)	Wire and cable insulation and mechanical goods for low-temperature service.

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Division of United States Rubber Company
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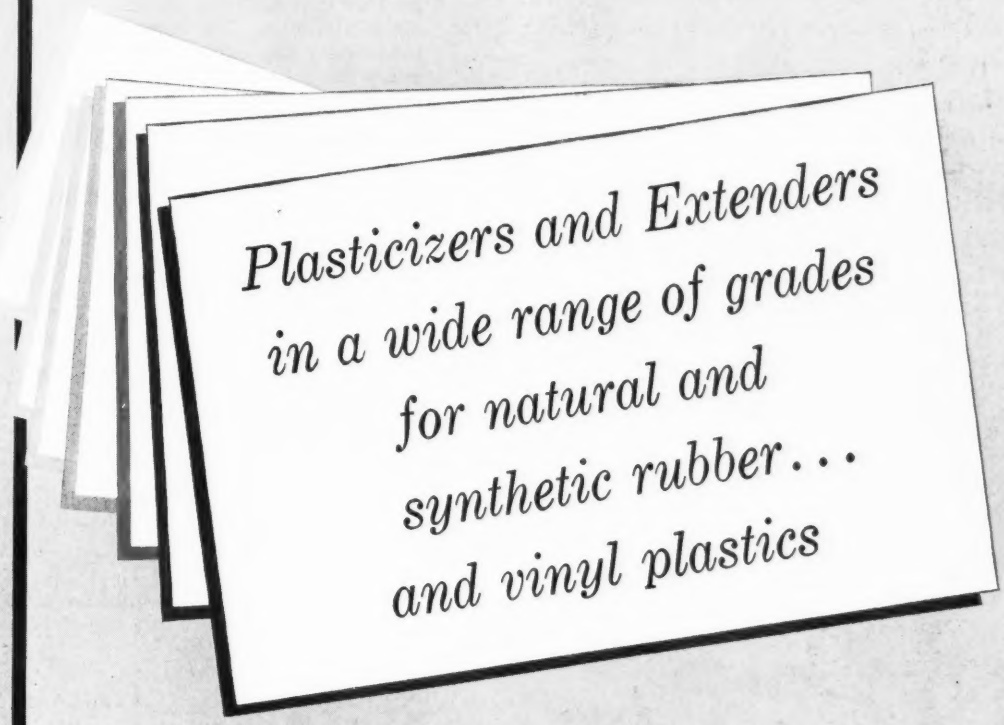

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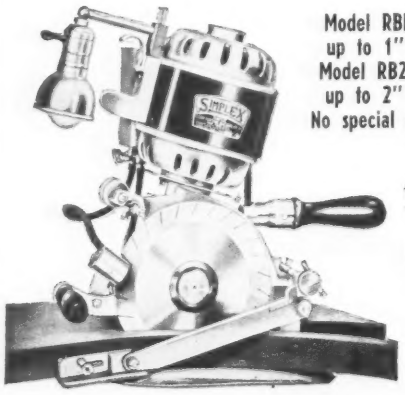

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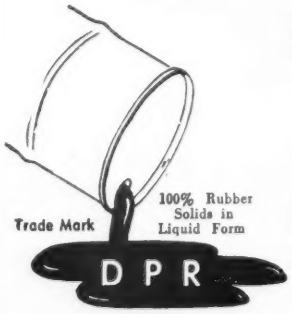

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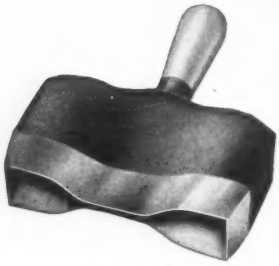

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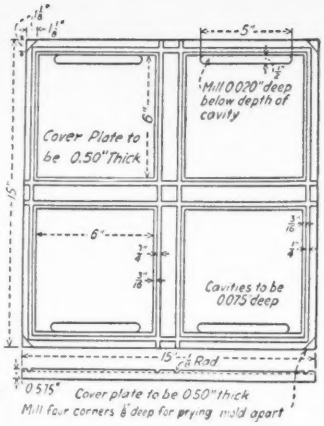
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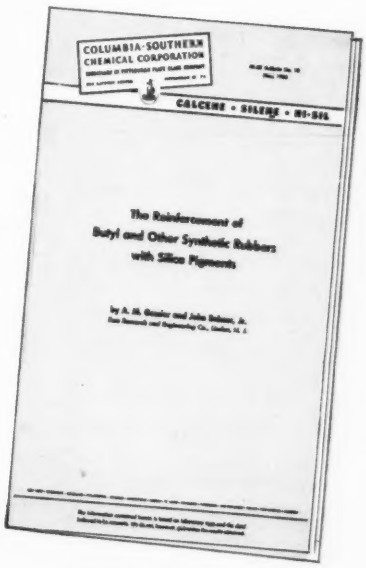
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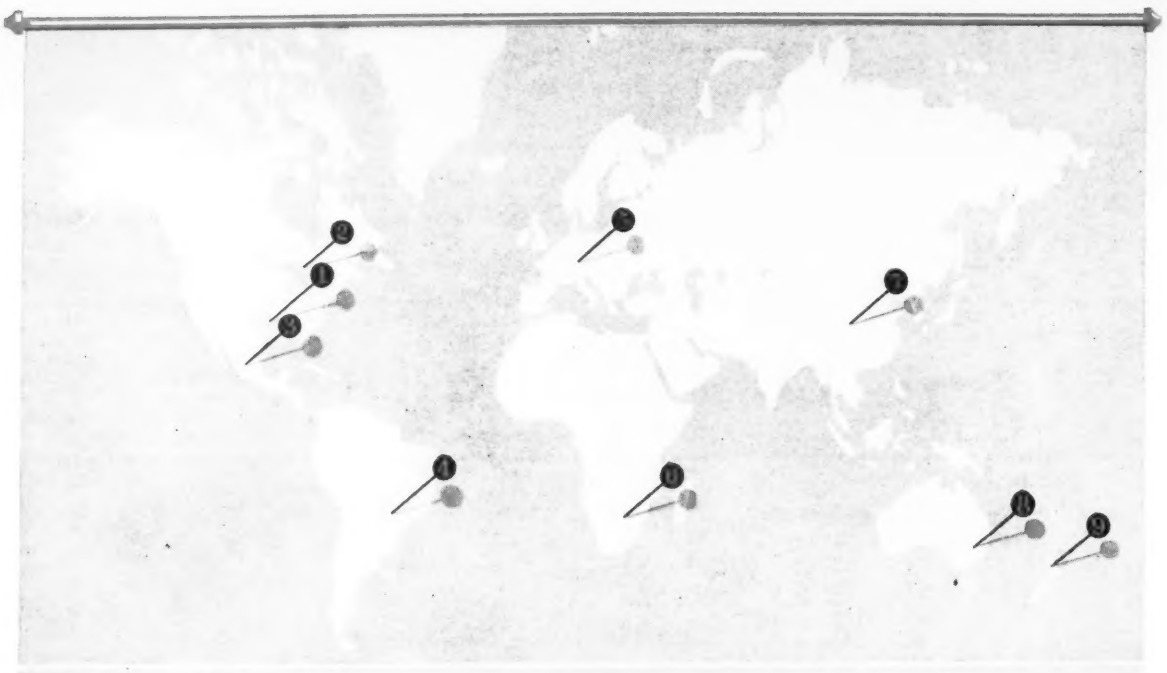

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RUBBER WORLD

JULY, 1956

VOLUME 134, NUMBER 4

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The Properties and Applications Of Coral Rubber—a *Cis* 1,4 Polyisoprene[1]

By GLEN ALLIGER, JAMES M. WILLIS, WARD A. SMITH, and JOHN J. ALLEN

The Firestone Tire & Rubber Co., Akron, O.

Coral rubber, a synthetic *cis* 1,4 polyisoprene, has demonstrated properties of low hysteresis and retention of tensile strength equivalent to those for natural *Hevea* rubber.

Heavy-duty truck tires made of Coral rubber and tested in comparison with similar tires made of *Hevea* rubber have confirmed the fact that this synthetic polyisoprene is a potentially satisfactory replacement for *Hevea* in bodies and treads of these tires.

The properties of Coral rubber also indicate that it could be used successfully in certain mechanical goods applications such as motor mountings, because of superior blowout resistance.

SYNTHESIS by lithium catalysis of a polyisoprene having the essential molecular structure of natural rubber was described in a recent paper (1).[2] Discovery of this new polymer, Coral rubber, represents a possible answer to the need of a synthetic polymer suitable for heavy-duty truck and bus tires, a need never adequately met by general-purpose styrene-butadiene copolymer (SBR). Even passenger tires manufactured for today's competitive market require substantial amounts of natural rubber. Many mechanical goods items such as motor mounts, bushings, and industrial wheels are made entirely or partly of natural rubber. Coral rubber is a potential competitor of natural (*Hevea*) rubber for these applications.

By way of introduction, it should be emphasized that the properties of Coral rubber vulcanizates are primarily due to its microstructure. Like natural rubber, Coral rubber is essentially a 1,4 *cis* polyisoprene with a head-to-tail arrangement of the isoprene units. The 1,4 *cis* structure of Coral rubber was established by its infrared spectrum. The head-to-tail arrangement was proved by ozonolysis which yielded the products to be expected from a head-to-tail structure, the same products which are obtained in the same relative amounts by ozonolysis of *Hevea* rubber (1).

Since Coral rubber has a microstructure similar to that of *Hevea*, it should yield an X-ray pattern similar to that of *Hevea*. Such patterns were obtained both stretched and unstretched (Figure 1). Coral rubber, like *Hevea* rubber, is a high molecular weight polymer. So *Hevea* and Coral are similar both in micro and macrostructure.

The purpose of this paper is to discuss the properties of Coral rubber as they are related to those of natural rubber (*Hevea*) and other synthetic polymers, particularly emulsion polyisoprenes and styrene-butadiene

[1] Presented before the Rubber & Plastics Division, ASME, Cleveland, O., June 18, 1956.

[2] Numbers in parentheses refer to Bibliography items at end of this article.

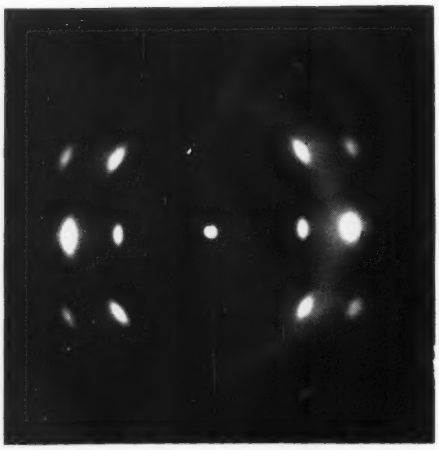
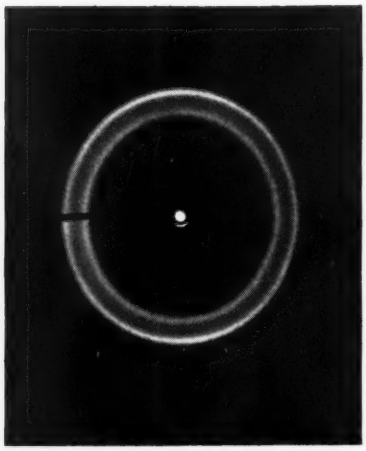


Fig. 1. X-Ray diffraction patterns of natural and synthetic polyisoprene. Left photo, patterns for stretched polymers, *Hevea* on left, Coral on right. Right photo, patterns for Coral in unstretched condition



copolymers polymerized at 40-50° F., which will be subsequently referred to as low-temperature polymers or LTP. These polymer comparisons are made with a view to the particular quality requirements of commercial tire and mechanical goods compounds.

Processing and Gum Stocks

Mill Breakdown and Mixing

The Coral polymers used in most of these studies were pilot-plant preparations having inherent viscosities in toluene (2) in the range of 7.0-14.0 and containing little or no gel (i.e., that portion of the polymer insoluble in toluene). That is, Coral rubber used in stocks described below had average molecular weights as high as or higher than unmilled natural rubber. On a cold mill, Coral polymer broke down rapidly, as does natural rubber (Figure 2). Addition of black and other compounding ingredients on a 180° F. laboratory two-roll mill, after a few minutes' breakdown to insure a smooth band of polymer, was found to be a satisfactory procedure for mixing gum stocks and compounds with low black loadings.

Coral Gum Stocks

Since Coral rubber is an elastomer of high molecular weight and regularity so that it crystallizes or is oriented when stretched, it would be expected to have the high gum tensile strength characteristic of natural rubber. Coral rubber also should have the same general reactivity with sulfur or sulfur-accelerator combinations which is possessed by *Hevea* because its molecular structure is essentially that of *Hevea*.

To compare gum vulcanizate properties of *Hevea* and Coral polymers, both were compounded in an ACS #2 (3) formula modified slightly by reducing the sulfur from 3.5 to 3.0 parts and adding 1.0 part of Santoflex BX.[3] This formula is unsuitable for LTP which requires higher accelerator; so for this polymer the following recipe was used:

LTP SBR	100
Stearic acid	1
Zinc oxide	5
Sulfur	2
Santocure[4]	1.2
Antioxidant	1

The rate of vulcanization of Coral rubber, as meas-

[3] Blend of 1,2-dihydro-2,2,4-trimethyl-6-phenyl quinoline and N,N'-diphenyl-p-phenylenediamine. Monsanto Chemical Co., Rubber Chemicals Department, Akron, O.

[4] N-cyclohexyl-2-benzothiazolesulfenamide. Monsanto Rubber Chemicals Department.

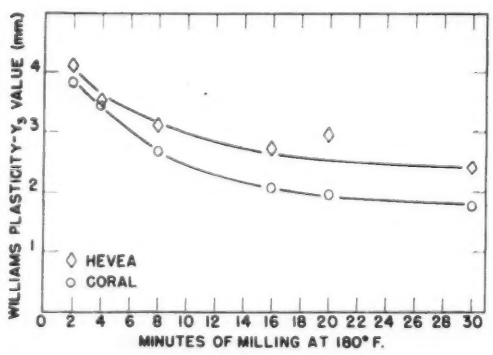


Fig. 2. Breakdown characteristics (Williams plasticity) of Coral and natural rubber on milling

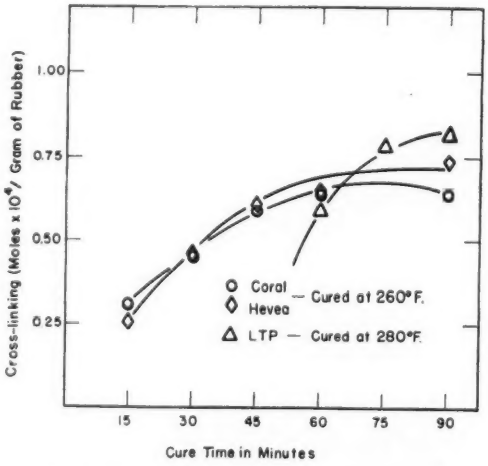


Fig. 3. Cure rate of Coral, *Hevea*, and LTP SBR gum stocks as measured by cross-linking

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Mr. Smith is a member of the American Chemical Society, the Akron Rubber Group, and Beta Theta Pi.

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Mr. Allen is a member of the American Chemical Society and its Rubber Division and of the American Society for Testing Materials. In the latter organization he is secretary of the joint ASTM-SAE Technical Committee on Automotive Rubber.

ured by the change in degree of cross-linking with time of cure at 260° F., was almost identical to that of natural rubber (Figure 3). LTP, on the other hand, as has been previously demonstrated by Adams and Johnson (4), had a very long induction period even at 280° F.; 60 minutes at this latter temperature were required for a tight cure. Cross-linking was determined by equilibrium swelling in toluene, a method described by Flory and Rehner (5).

The rates of combination of sulfur with Coral and *Hevea* rubbers at 260° F. in the modified ASC #2 formula were about the same (Figure 4). The combined sulfur values were obtained by subtracting the free sulfur (determined) from the sulfur added. Therefore, any particular combined sulfur value in Figure 4 represents the sum of that fraction of sulfur which was combined with the polymer and the sulfur converted to zinc sulfide during vulcanization.

The corresponding modulus curves for Coral and *Hevea* rubbers are plotted in Figure 5. The slopes of these curves indicate that Coral cures at a rate approaching that of *Hevea*.

A summary of properties of Coral, *Hevea*, and LTP gum compounds will be found in Table 1.

Reinforced Coral Compounds

Curing Ingredients

Best results were obtained with Coral black stocks by using sulfur concentrations slightly lower than used for similar *Hevea* stocks. Accelerator requirements for both polymers were about the same as and less than for LTP. Even so, the rate of combination of sulfur with Coral was slightly greater than for *Hevea* (Figure 6) in an HAF (50 phr) recipe. It must be remembered that Coral polymers, unlike LTP or *Hevea*, have no fatty acid content. Otherwise there is nothing unusual about the zinc oxide or fatty acid requirements of Coral rubber.

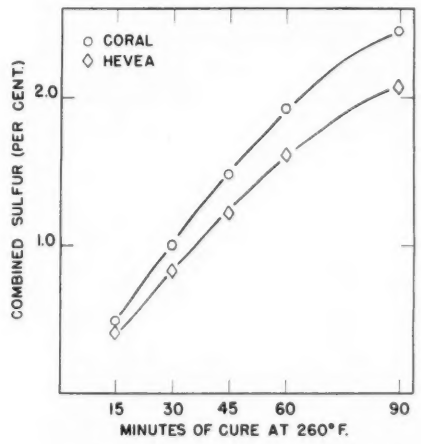


Fig. 4. Rate of sulfur combination for Coral and natural rubber in a gum recipe

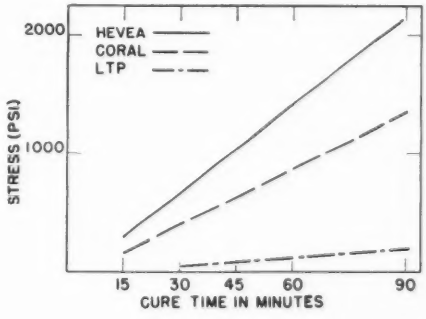


Fig. 5. Modulus of Coral, *Hevea*, and LTP SBR polymers in a gum recipe

TABLE 1. VARIOUS PROPERTIES OF CORAL, *HEVEA*, AND LTP GUM STOCKS

(Cured in ACS #2 Recipe Less 0.5 phr of Sulfur and Plus 1.0 phr of Santoflex BX)

Cured @ 260° F. (Min.)	Coral	*Hevea*	Cured @ 280° F. (Min.)	LTP
		600% Modulus,* Psi.		
15	200	125	45	No cure
30	375	575	60	< 100
45	600	1000	75	100
60	825	1200	90	100
		Tensile @ Break,* Psi.		
15	2250	2325	45	No cure
30	3575	3875	60	200
45	3100	3700	75	200
60	3550	4275	90	175
		Elongation @ Break*		
15	1020	1010	45	No cure
30	940	880	60	380
45	800	800	75	320
60	790	790	90	240
		Dynamic Properties		
Cure	60′ @ 260° F.		60′ @ 260° F.	75′ @ 280° F.
Hysteresis @ 212° F.†				
Dynamic modulus, psi.	57		58	83
Internal friction, kps.	0.2		0.3	0.9
				45′ @ 300° F.
Ball Rebound, % ‡				
72° F.	84		78	65
212° F.	85		76	71

*Stress-strain properties in this table and subsequent ones of this paper were determined in a conventional manner on a Scott Testers, Inc., tensile tester.

Tensile Properties

A study was made of the effect of increasing black (HAF) loading on tensile strength and other vulcanizate properties of Coral, *Hevea*, and LTP compounds. For this purpose the following formula was selected:

Polymer	100.0
HAF black	Variable
Zinc oxide	3.0
Stearic acid	2.0
Softener	3.0
Antioxidant	1.0
Sulfur	2.0
Santocure NS[5]	0.8 *Hevea* / Coral
	1.2 LTP

The variation in tensile strength and elongation at break with black loading is shown in Table 2. Coral and *Hevea* rubbers had good tensile strength at black levels as low as 10 phr. LTP, on the other hand, required 30 phr of black for satisfactory tensile strength. *Hevea* and Coral retained a large proportion of their tensile strength at 212 and 275° F. even with low black loadings, but LTP retained very little strength except at high loadings. More important, Coral, like *Hevea*, retained its elongation well at 212 and 275° F: while LTP compounds became very short at these elevated temperatures.

[5] N-t-butyl-2-benzothiazolesulfenamide. Monsanto Rubber Chemicals Department.

†Dynamic modulus and internal friction were determined on a shear vibrometer (6). This instrument is a forced resonance vibrator in which samples are deformed in shear at 60 cycles per second.

‡Rebound measurements were made on a falling ball apparatus (7).

TABLE 2. THE EFFECT OF BLACK LOADING ON TENSILE STRENGTH OF CORAL, *HEVEA*, AND LTP

(Cured 60 Minutes at 280° F.)

	HAF Black—Phr						
	10	20	30	40	50	60	70
			Tensile at Break, Psi.				
Tested at 72° F.							
Coral	3800	4050	3825	3675	3425	3450	3200
Hevea	4075	4600	4575	4075	4025	3500	2525
LTP	1050	2500	3650	3600	3500	3525	3375
Tested at 212° F.							
Coral	1020	1120	1660	1810	2040	2150	1900
Hevea	2000	1650	1980	2450	2380	2100	1240
LTP	140	280	730	990	1100	1240	1270
Tested at 275° F.							
Coral	400	740	920	1230	1400	1360	1430
Hevea	570	670	1270	950	1650	1530	960
LTP	150	200	425	750	800	875	770
			Elongation at Break, %				
Tested at 72° F.							
Coral	740	720	660	600	520	480	360
Hevea	660	620	580	510	430	330	230
LTP	580	680	680	580	480	380	300
Tested at 212° F.							
Coral	590	570	620	580	520	450	300
Hevea	690	550	600	535	450	350	165
LTP	225	275	375	315	295	260	300
Tested at 275° F.							
Coral	310	440	440	470	430	330	270
Hevea	400	340	450	280	415	310	160
LTP	140	165	210	235	185	175	135

Table 3 shows tensile strength and elongation values at various temperatures up to 400° F. for Coral, *Hevea*, and LTP rubbers with HAF black at the 50 phr level. Coral and *Hevea* were superior tensile-wise to LTP at intermediate temperatures, but all three polymers had about the same strength at 350° F. or above. With respect to retention of elongation at break, Coral and *Hevea* were superior to LTP over the whole range of temperatures (200-400° F.).

TABLE 3. TENSILE STRENGTH AND ULTIMATE ELONGATION OF CORAL, *HEVEA*, AND LTP COMPOUNDS*

Test Temp., ° F.	Coral† Tensile, Psi.	Coral† Elong., %	*Hevea*‡ Tensile, Psi.	*Hevea*‡ Elong., %	LTP§ Tensile, Psi.	LTP§ Elong., %
73	3825	520	3775	450	3750	450
200	2570	490	2845	500	1720	280
250	1925	450	2350	510	1230	240
300	1340	430	1490	450	1000	200
350	760	480	910	510	780	170
400	180	440	410	480	390	140
	Aged 8 Hours at Test Temperature					
200	2320	400	2430	400	1560	200
250	430	150	470	150	925	130
300	340	340	540	390	380	50
350	180	220	350	250	170	220
400	115	110	..	..	125	10

*50 HAF black loading.
†Sulfur 2.25, Santocure NS 0.35, Retarder I.0.
‡Sulfur 2.6, Santocure 0.5, Retarder I.0.
§Sulfur 2.0, Santocure 1.2.

Dynamic Properties

Properly mixed, Coral compounds had the same dynamic properties as *Hevea* compounds if measured at equal black loadings (Figure 7). The method of mixing however, had a pronounced effect on both the internal friction (Figure 8) and the dynamic modulus (Figure 9) of *Hevea* and Coral compounds, particularly at high black loadings (50, 60, or 70 phr).

Low internal friction and dynamic modulus values mean low hysteretic loss and hence less heat build-up (6). Therefore Banbury mixing is to be preferred for Coral and *Hevea* stocks since it gives low internal

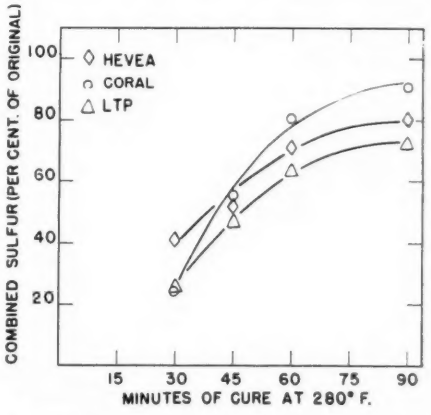


Fig. 6. Rate of sulfur combination for Coral, *Hevea*, and LTP SBR polymers in an HAF carbon black (50 phr) recipe

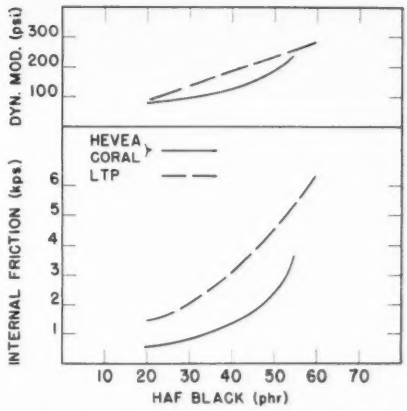


Fig. 7. Internal friction as a function of black loading (Banbury mixing)

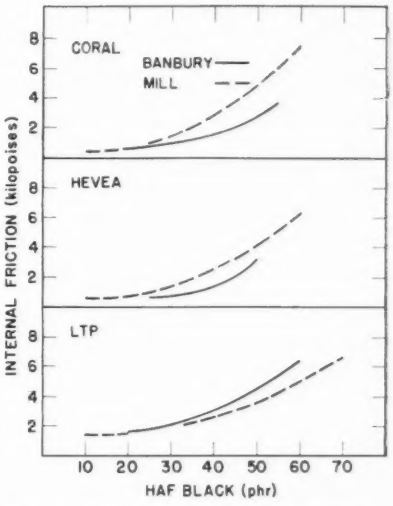


Fig. 8. Effect on internal friction of Banbury *vs.* mill type of mixing

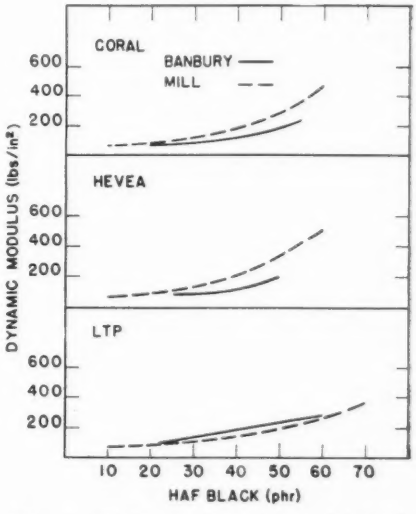


Fig. 9. Effect on dynamic modulus of Banbury *vs.* mill type of mixing

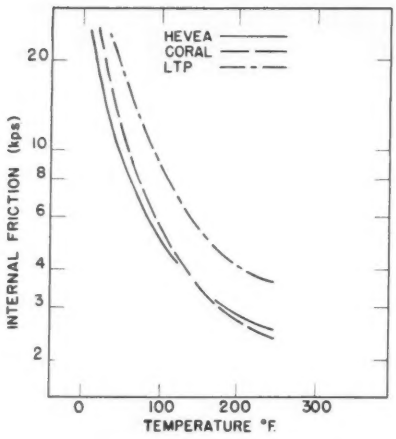


Fig. 10. Internal friction as a function of temperature (50 phr HAF black compound)

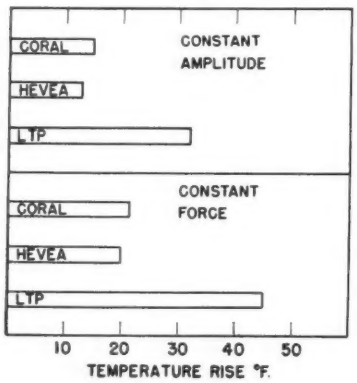


Fig. 11. Heat build-up as measured on the Firestone shear flexometer (25 phr HAF compound)

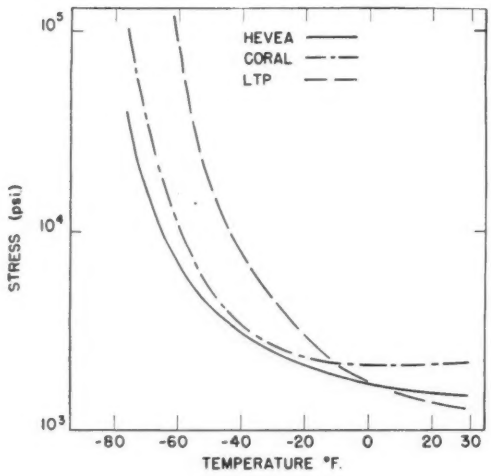


Fig. 12. Young's bending modulus of Coral *vs.* *Hevea* *vs.* LTP SBR (50 phr HAF compound)

friction and dynamic modulus values as compared to those of the corresponding mill mixed stocks. The effect of the method of mixing on the dynamic properties appeared to be very slight for LTP compounds at any black level.

It was shown above (Figure 7) that hysteresis properties of Coral and *Hevea*, as measured by internal friction and dynamic modulus, were equal at all black loadings if Banbury mixed. Confirmation of the basic equality of Coral and *Hevea* with respect to dynamic properties is supplied by the data graphed in Figure 10 which shows the internal friction of Coral to be equal to that of *Hevea* and lower than that of LTP over a temperature range from 0 to 250° F. For these tests, all three polymers were compounded with 50 phr of HAF black.

Heat build-up was also *directly* measured on the Firestone shear flexometer (8) both at constant force and constant amplitude (Figure 11). The temperature rise for Coral was similar to that of *Hevea* for both conditions of test; while that of LTP was much higher than for either polyisoprene. Compounds used in this experiment had a 25 phr loading of HAF black.

Cold Resistance

A number of tests were applied to Coral, *Hevea*, and LTP compounds (all loaded with 50 phr of HAF black) to determine the relative cold resistances of these three polymers. The Young's bending modulus (9) curves (Figure 12) show very strikingly the similarity of Coral and *Hevea* with respect to cold resistance. A summary of other cold resistance tests (7, 9-11) is given in Table 4.

TABLE 4. LOW-TEMPERATURE PROPERTIES OF CORAL, *HEVEA*, AND LTP COMPOUNDS*

	Coral	Hevea	LTP
Low temp. shear recovery, ° F. (10)†	—27	—31	—9
Minimum rebound temp., ° F. (7)	—36	—36	—8
Bell brittle point, ° F. (11)	—74	—67	—69
Low temp. index, ° F. (9)‡	—67	—62	—42

*50 phr HAF black loading (see Table 3 for sulfur and accelerator ratios).
†Temperature for 50% recovery in one minute.
‡Temperature at which the Young's bending modulus reaches a value of 10^4 psi.

Aging Properties

In general, Coral rubber has better resistance to accelerated oven or bomb aging than *Hevea*. However, the oxygen absorption rate (12) of Coral polymer

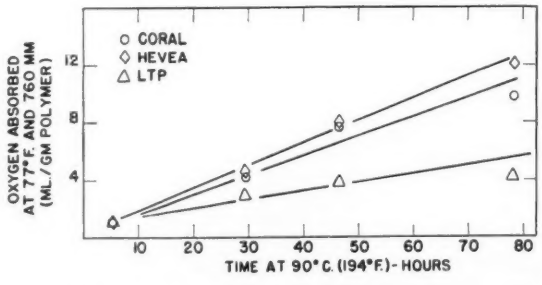


Fig. 13. Oxygen absorption rate of Coral, *Hevea*, and LTP SBR polymers (50 phr HAF compound)

was found to be similar to that of *Hevea* and higher than that of LTP (Figure 13).

Similarly, the continuous stress relaxation curves (at 50% elongation) determined for Coral and *Hevea* 50 HAF compounds are identical (Figure 14), showing a faster rate of stress decay than does LTP. The procedure used in this study is that described by Tobolsky, Prettyman, and Dillon (13).

Intermittent stress relaxation studies disclosed an even more fundamental difference between Coral and *Hevea* on the one hand and LTP on the other (Figure 15). The tendency of LTP to cross-link on aging, with a resultant increase in modulus in contrast to the predominant chain scission with resulting stress decay which is characteristic of *Hevea*, has been pointed out by a number of investigators including Tobolsky, Andrews, and Hanson (14) and Shelton and Cox (15).

As might be predicted from the stress relaxation or oxygen absorption results, *Hevea* and Coral behave similarly on aging under various standard conditions as measured by the % change in tensile and elongation properties (Table 5).

TABLE 5. AGING RESISTANCE OF CORAL, *HEVEA*, AND LTP COMPOUNDS* UNDER VARIOUS CONDITIONS

Property (cure—60 minutes @ 280° F.)	% of Original Property Retained		
	Coral†	Hevea‡	LTP§
	Oven Aging—48 Hours at 212° F.		
Tensile @ break	61	45	80
Elongation @ break	62	55	49
	Oven Aging—14 Days at 158° F.		
Tensile at break	89	82	94
Elongation at break	78	80	65
	Oxygen Bomb—96 Hrs. at 158° F.		
Tensile at break	75	59	88
Elongation at break	86	87	82
	After 80 Hrs. O_2 Absorption at 194° F.		
Tensile @ break	55	43	87
Elongation @ break	62	55	59

*50 phr HAF black loading.
†Sulfur 2.25, Santocure NS 0.35, Retarder 1.0.
‡Sulfur 2.6, Santocure 0.5, Retarder 1.0.
§Sulfur 2.0, Santocure 1.2.

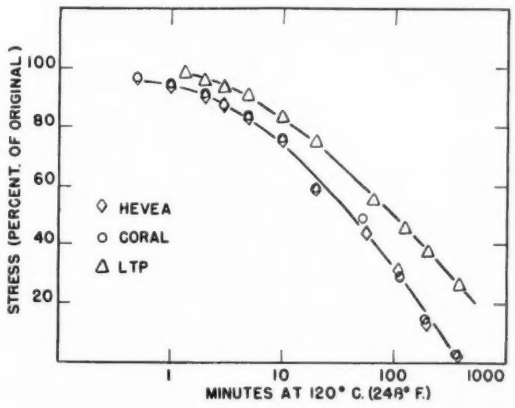


Fig. 14. Change of stress on continuous elongation (50%) at 120° C. (50 phr HAF compound)

Applications of Coral Rubber

The first part of this paper was devoted to a discussion of the compounding of Coral rubber and the properties of this new polymer relative to *Hevea* and LTP. This second part is concerned with specific applications of Coral rubber. Since Coral rubber was developed primarily to meet the need of a synthetic polymer suitable for heavy-duty truck and bus tires, the use of Coral rubber in tire compounds will be considered first, prefaced with a brief discussion of the quality requirements of large tires and the history of attempts to apply synthetic polymers to this use.

Natural Rubber vs LTP in Truck Body Stocks

As stated earlier, the bulk of natural rubber consumed by the tire industry is used in treads and bodies of heavy-duty tires. Body stocks for such tires particularly require natural rubber not only for adequate performance in service, but for suitable building tack. Specifically, tack is required for satisfactory "turn ups" and "turn downs" of body plies about the beads. If tack is not sufficient, the plies come loose from the bead with the result that a "pinched" or otherwise unsatisfactory bead occurs when the tire is cured.

"Inserts" between the plies of truck tire bodies also require good green strength and tack. An inherent weakness may be introduced in truck tire body plies as a result of poor tack, which will show up later as a premature tire failure. Natural rubber has adequate green strength and tack required for proper tire construction; while LTP does not.

Low Heat Build-up or High Hot Tensile LTP Body Stocks

Early work on synthetic body stocks for truck tires led to the conclusion that low heat build-up and high strength at tire operating temperatures were essential for long tire life. A truck tire project was set up to

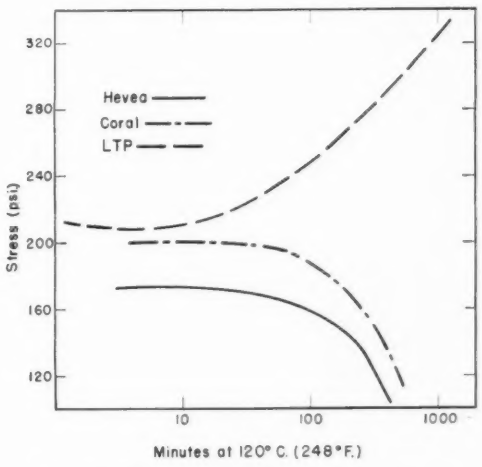


Fig. 15. Change of stress on intermittent elongation (50%) at 120° C. (50 phr HAF compound)

determine the effect on truck tire performance of these two properties (16).

Specifically, high Mooney LTP was compounded with low black and a relatively large amount of oil so as to have low internal friction (equal to natural rubber) and consequently low heat build-up. A second LTP compound was formulated in such a way as to obtain hot tensile and elongation properties much superior to those of a standard low black LTP compound, but without affecting the hysteresis properties. These compounds were tested as body compounds in 11.00-20 truck tires using natural rubber and SBR 1500 controls. Both the experimental and control tires had *Hevea*/LTP (SBR 1500) 50/50 treads. The overall synthetic content was 68% for all tires except for the *Hevea* controls which contained no LTP.

The properties of these compounds are shown in Table 6 along with the performance of the tires tested on a test fleet under conditions of high overload. It will be noted that both experimental constructions were much superior to the standard LTP control as measured by mileage to failure, but were inferior to the natural rubber controls. The results suggest that both low hysteresis and retention of tensile properties at high temperatures are important factors in truck-tire body durability.

TABLE 6. LTP BODY STOCK PROPERTIES VS. TRUCK TIRE DURABILITY*

SIZE: 11.00—20 OVERLOAD—45%

	LTP SBR			
Tensile strength, psi., @	Control†	Low Hysteresis†	High Tensile†	*Hevea*†
72° F.	2075	850	3025	3350
212° F.	150	150	325	1900
Ultimate elongation, %, @				
72° F.	580	360	750	690
212° F.	180	130	340	750
Hysteresis @ 212° F.				
Dynamic modulus, psi.	86	65	100	63
Internal friction, kps.	1.7	0.6	2.2	0.6
Tire durability				
Average miles	13,500	24,900	23,800	37,292‡
Index	100	183	176	276‡

*Test run as Project "DK" under auspices of Federal Facilities Corp., Office of Synthetic Rubber, Research and Development Division, Polymer Science Branch, Washington, D. C.
†Properties of inner body compound only.
‡No failure.

Emulsion Polyisoprenes vs. Coral in Tires

Polyisoprenes prepared in free radical initiated, emulsion systems have been extensively investigated. It was discovered (17-19) that polymers of isoprene or copolymers of isoprene with styrene or other monomers, while deficient in many respects, had better hysteresis properties (i.e., lower internal friction) and, as a result, lower heat build-up in tire compounds than did the corresponding butadiene copolymers. Since low heat build-up is required for body compounds used in heavy-duty truck tires, polyisoprene and isoprene/styrene polymers were tested and retested in tires (20) without, however, effecting any measurable improvement over the SBR controls! Also polyisoprenes had poor wear resistance in tread compounds (21) and were no better than SBR in resistance to cut growth. The poor performance of emulsion polymerized isoprene polymers may be explained, at least partly, by their poor strength at elevated temperatures. Of course it was discovered later that emulsion polyisoprenes have not more than 35% *cis* 1,4 structure (22, 23), which probably explains the lack of strength.

One might conclude, therefore, that a polymer (and specifically a polyisoprene) which approached natural rubber only in dynamic properties would be inadequate for heavy-duty tire service, a conclusion also reached from tire test results of the low hysteresis LTP body compound mentioned above (Table 6).

It has been impossible, heretofore, to combine both of these properties (low heat build-up and high strength at elevated temperatures) in the same synthetic construction. Coral rubber is the first synthetic rubber, suitable for tires, to give promise of meeting both of these requirements. It should be added that, to a degree, the tread stocks in heavy-duty tires should meet these requirements also. Yet it must be emphasized that heat build-up and good hot tensile strength are not the only properties important to good truck body performance. Cohesive quality and green strength for building quality affect tire performance to a greater or lesser extent (24).

Coral in Tire Body Compounds

As mentioned above, the fact that Coral rubber is like natural rubber in having good strength in the uncured state, low hysteresis or heat build-up properties, and good retention of tensile properties at elevated temperatures makes it a potential polymer for use in body compounds designed for heavy-duty bus and truck tires.

Properties of Coral, *Hevea*, and LTP rubber compounded in a typical body stock formulation are shown in Table 7. It will be noted that the hysteresis properties were low and equal to those of the *Hevea* control. Also the hot tensile strength of the Coral stock was excellent, being much better than that of the LTP compound, and very slightly better than that of the *Hevea* control.

TABLE 7. TIRE BODY COMPOUNDS OF CORAL, *HEVEA*, AND LTP

(Black—25 phr)

Tensile Properties—Cured 45 Minutes at 280° F.

	Hevea	Coral	LTP
300% Modulus, psi.	600	600	425
Tensile strength, psi.	3675	3825	3050
Elongation, %	680	700	780
Properties @ 212° F.			
Tensile, psi.	1825	1900	575
Elongation, %	650	660	370

(Black—25 phr)

Dynamic Properties—Cured 45 Minutes at 280° F.

Internal friction, kps.	0.6	0.6	2.8
Dynamic modulus, psi.	73	71	109

Coral stocks of this type were calendered without difficulty in sheets or on tire fabric. Coral body plies were built into tires without using cements, indicating that Coral rubber has adequate building tack.

TABLE 8. CORAL *VS.* *HEVEA* *VS.* LTP—50 HAF TREAD STOCK

	Coral	*Hevea*	LTP
	Mooney Scorch at 250° F.*		
TS (min. to 1-point rise)	40	27.5	39
TC (min. to 10-point rise)	40	40	40
	Properties Cured 60 Minutes at 280° F.		
300% Modulus, psi.	1900	1950	2025
Tensile, psi.	3825	4150	3975
Elongation, %	550	540	510
	Shore A Hardness		
	63	61	65
	Forced Vibrator† at 100° C.		
Dynamic modulus, psi.	191	187	198
Static modulus, psi.	163	150	139
Internal friction, kps.	2.6	2.7	3.7
	Firestone Flexometer (26)‡		
Running temp., °F.	250	250	275
Blowout time, min.	24.5	18	105
	Properties at 212° F.		
Tensile, psi.	2200	2430	1330
Elongation, %	525	580	280
	Properties at 275° F.		
Tensile, psi.	1275	1650	925
Elongation, %	400	650	215
	Ring Tear—Lbs./In.		
@ 212° F.	386	569	267
275° F.	325	395	244
	Crack Growth§		
.01-In./hr.—normal	0.4	0.3	18.7
Aged 5 hr. air bomb	17.5	16.5	143
	Normal Crack Initiation at 200° F.§		
Number of cracks—large	2	0	1
medium	1	2	0
small	2	9	0
Total	5	11	1
Rating (1 = best)	2	3	1
	Compression Set (22 Hours—70° C.—30% Deflection)		
% Set	8.42	9.72	7.82
	Permanent Set (5 Hours at 225° F. at 50% Elongation)		
% Set	25	31	27
	Aged 2 Days at 212° F.		
300% Modulus, psi.	2100	1875	
Tensile, psi.	2300	1875	3175
Elongation, %	340	300	250
	Aged 14 Days at 158° F.		
300% Modulus, psi.	2350	2425	3425
Tensile, psi.	3425	3425	3725
Elongation, %	430	430	330
	Aged 96 Hours Air Bomb		
300% Modulus, psi.	1800	1600	2550
Tensile, psi.	2800	2450	3500
Elongation, %	470	470	420

*Mooney scorch was determined as described by Shearer, Juve, and Musch (25).
†See Table 1.
‡Running temperature was determined at 250 lbs. and 0.3 throw; blowout time at 550 lbs. and 0.4 throw, as described by Cooper (26).
§Cut growth was the measured growth of precut samples flexed at room temperature, as described by Prettyman (27).
§Crack initiation resistance was measured by testing uncut samples under more severe conditions (27).

Coral Tread Compounds

Low heat build-up and good strength at high temperatures are important properties of tread compounds as well as of body stocks. The data of Table 8 support the conclusion that Coral rubber approaches or equals the quality of natural rubber with respect to tensile strength, hot tensile strength, and hysteretic loss. Besides internal friction and dynamic modulus values, actual heat build-up was measured on the Firestone flexometer (26). Both tests indicated Coral and *Hevea* tread stock to be equal for heat build-up.

It should be noted particularly that Coral was equal to *Hevea* for both normal and aged cut growth resistance. Yet Coral was superior to *Hevea* and similar to LTP with respect to crack initiation resistance.

Tire Tests

As stated earlier in this paper, Coral rubber has the low hysteretic loss characteristic of natural rubber. To determine whether this low hysteresis actually meant low heat build-up in tires, two truck tires, one Coral throughout and a *Hevea* control, were placed on test on the indoor wheel at the same time. Starting at 35 mph., the speed was increased at regular intervals, and the contained air temperature measured throughout the test. The temperatures for the two tires were equal within experimental error throughout the whole course of the experiment (Figure 16).

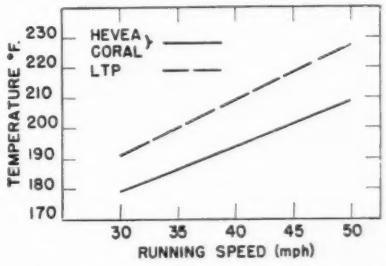


Fig. 16. Contained air temperature of 9.00 by 20 truck tires running on indoor wheel at 125% of rated load

Besides the above test, measurement of shoulder and contained air temperatures during fleet tests also showed Coral tires to run as cool as those of natural rubber (Table 9). Furthermore, although tires of 100% LTP or of largely LTP construction tend to fail from tread or ply separation, no Coral tire tested to date (although a total of 500,000 test miles has been accumulated on Coral truck tires) has failed for either of these reasons. Tests to date have indicated that the body durability of Coral truck tires equals that of tires of natural rubber construction.

Both Coral passenger and truck tires having wear resistance substantially equal to that of *Hevea* tires have been built and tested (Table 10). Furthermore, the superior laboratory crack initiation resistance and cut growth resistance of Coral rubber are borne out by tire tests (Figure 17) which show Coral passenger tires to be much more crack resistant than natural rubber.

TABLE 9. TEMPERATURE MEASUREMENTS ON CORAL AND *HEVEA* TRUCK TIRES

(9.00-20)

(Firestone Test Fleet—Tractor Rears)

	Contained Air Temp., °F.		Shoulder Temp., °F.	
	Left Rear	Right Rear	Left Rear	Right Rear
Hevea	170	177	191	200
Coral	170	185	190	202

TABLE 10. CORAL TRUCK TIRE TESTS

(Commercial Highway Service—Tractor Rears, Dual)

Size —9.00-20 Overload—Variable
Season—Year round Inflation —65 psi.

Construction	Average Mileage	Average Skid Loss	Comment
Coral body stocks, *Hevea* treads	39,560	67%	Removed—no failures
Coral body stocks, Coral treads	34,280	70%	On test—no failures

TABLE 11. CORAL, *HEVEA*, AND LTP IN A MOTOR MOUNTING COMPOUND*

(50 Minutes at 280° F.)

	Coral	*Hevea*	LTP
Dynamic modulus, psi.	79	102	113
Internal friction, kps.	0.5	0.7	2.0
Shore A hardness	57	58	57
% Deflection (26) (500# load)	46.7	40.7	†46.7
Blowout time (26), min.	174	125	†17

*25 phr HAF black.
†Cure 75 min. @ 280° F.

Coral Motor Mounting Compounds

It was shown above (Figure 11) that low black Coral and *Hevea* compounds are equal with respect to heat build-up under conditions of constant force or constant amplitude. Since, however, Schmuckal (28) has shown that automobile motor mountings operate under conditions of constant energy input rather than constant force, the values of temperature rise for Coral, *Hevea*, and LTP stocks all compounded with 25 phr of HAF black are shown plotted in Figure 18 against energy input as measured in the Firestone shear flexometer (8). The *Hevea* and Coral curves are almost superimposed. LTP, on the other hand, showed a greater temperature rise than Coral or *Hevea*, particularly at higher energy inputs.

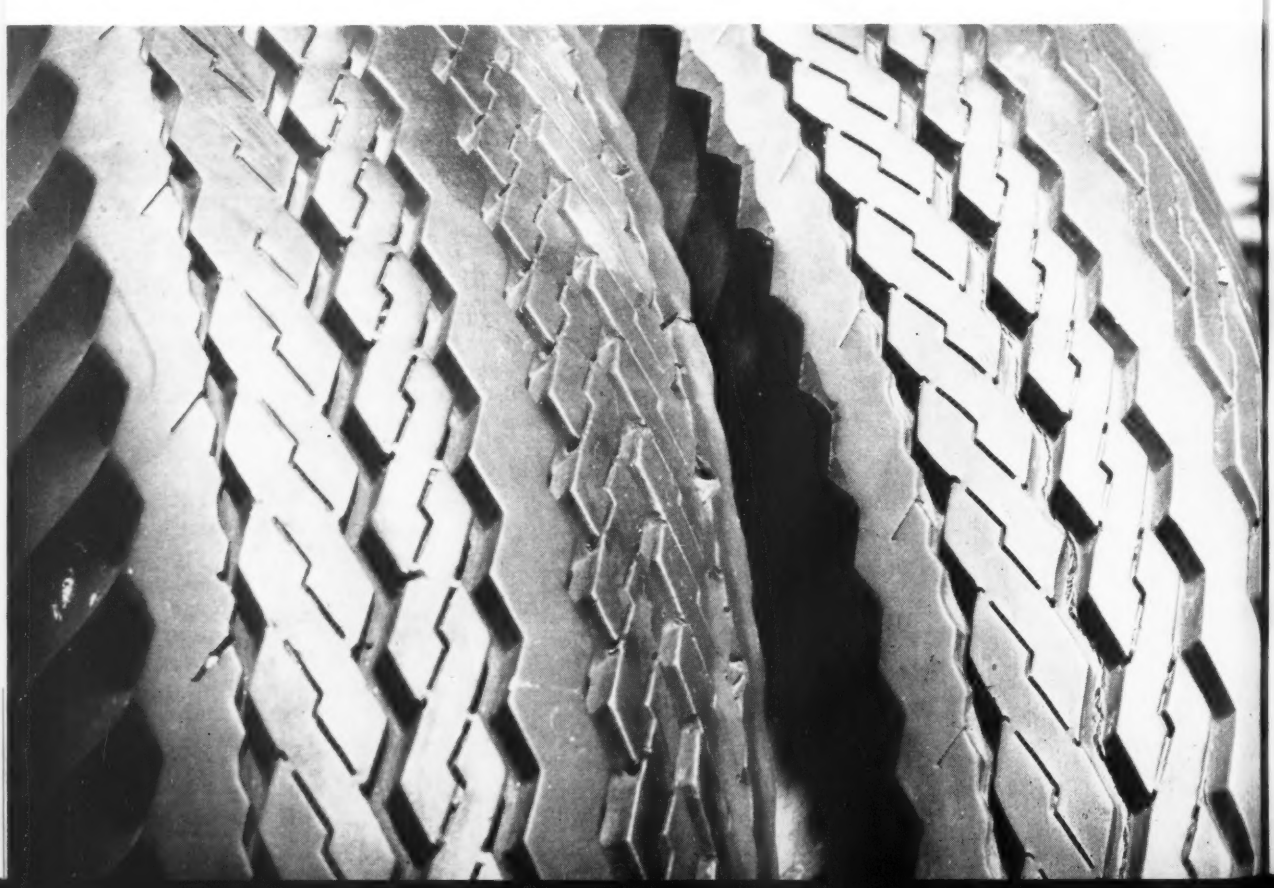
Measurement of blowout resistance (26) of these same compounds indicated Coral to be superior either to *Hevea* or to LTP (Table 11). Shore hardness was equal for all three compounds.

The fact that Coral rubber is equal to *Hevea* in heat build-up at the same energy input and superior to *Hevea* for blowout resistance suggests that Coral stocks could be prepared which would perform satisfactorily in motor mountings.

Summary and Conclusions

It has been demonstrated that low hysteresis and retention of tensile properties at elevated temperature are necessary properties of body compounds designed

Fig. 17. Crack resistance of Coral *vs.* *Hevea* treads on 8.00 by 15 passenger-car tires. Left, Coral, 12,000 miles, no cracking; right, *Hevea* 12,000 miles, cracking



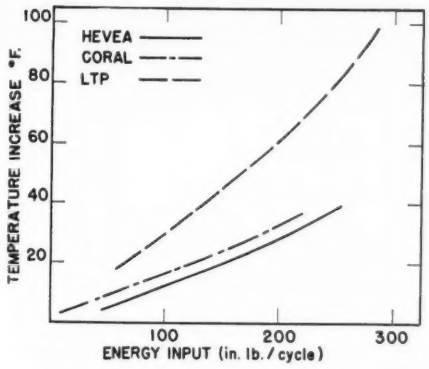


Fig. 18. Heat build-up as a function of energy input—Firestone shear flexometer

for use in heavy-duty truck and bus tires. *Hevea* rubber has these two properties, but no synthetic polymer, otherwise suitable for use in tires, previously met these requirements. However, Coral rubber, a *cis* 1,4 polyisoprene, has the essential quality of natural rubber.

In particular, Coral matches natural rubber with respect to the two properties mentioned above. Tire tests of Coral rubber have confirmed the fact that this new polymer is similar to *Hevea* and a potentially satisfactory replacement for *Hevea* in bodies and treads of heavy-duty truck tires.

The properties of Coral rubber also indicate that it could be successfully used in certain mechanical goods applications (e.g., motor mountings).

Acknowledgment

The authors wish to express their appreciation to Dr. F. W. Stavely for his interest and suggestions and to The Firestone Tire & Rubber Co. for permission to publish this work. They also wish to thank George L. Hall and Floyd S. Conant for their help in interpreting the data and for obtaining the stress relaxation and cold shear recovery data.

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Vultex Isocyanate Foam Compounds

General Latex & Chemical Corp., Cambridge, Mass., has announced its entry into the isocyanate foam field. The company will supply the isocyanates and polyester resins needed for polyurethane foam compounding as Vultex Isocyanate Foam Compounds.

Formulations to give different densities, hardness, and resiliency will be offered, together with engineering assistance for handling the techniques of the mixing operations, the company says.

According to General Latex, Vultex Compounds are based upon specially processed diisocyanates which have been chemically reacted by condensation reactions with resins or polyols, effectively reducing toxic effects since the volatility of the diisocyanates has been substantially lowered.

Foams produced from the compounds are said to have excellent solvent resistance, low flammability, low reactivity with oxygen, high tensile strength, and excellent insulation properties. Products of low density, about three pounds per cubic foot, can be readily made, the company reports.

Cross-Linking Tree Rubber Vulcanizates

A paper entitled, "Determination of Degree of Cross-Linking in Natural Rubber Vulcanizates," has been published by the British Rubber Producers' Research Association, Welwyn Garden City, Herts', England (Publication No. 227). The authors prepared natural rubber vulcanizates by a method permitting determinations by chemical analysis of the number of cross-links introduced.

The cross-linking agent was di-*tert*-butyl peroxide, and the peroxide and its decomposition products were determined by infrared spectroscopic and manometric methods. A comparison of the physical and chemical values of the degree of cross-linking was made, indicating that the former is greater for all degrees of cross-linking; the major divergence is accounted for by an additive term visualized as due to entanglements.

Visual Evidence for Agglomeration in High Solids Latex

By W. RUPAR and L. A. McLEOD
Polymer Corp., Ltd., Sarnia, Ont., Canada

IN A recent article Brown and Howland[1] presented some interesting electron micrographs to support their theory that a type of agglomeration in high solids styrene-butadiene (SBR) latex occurred at an early conversion of monomer to polymer. In our electron microscopy studies of a high solids latex we have obtained several interesting electron micrographs of samples taken at low conversion. A typical example is shown in the accompanying photograph.

The occurrence of the larger particles evident in this figure seemed to be peculiar to the polymerization conditions existing in this particular system, and we have not observed such particles in any other latex system. The polymerization was carried out at high temperature and involved a high styrene charge and synthetic emulsifiers. Conditions were adjusted to yield a wide particle-size distribution. When the polymerization conditions were altered to produce a narrow particle-size distribution, only the small particles evident in the background were observed.

In the preparation of this micrograph, a sample of the high solids latex of butadiene and styrene was stripped, brominated according to Brown's technique,[2] diluted and sampled on to a 200-mesh collodion covered screen, as described by Maron *et al.*,[3] and Swerdlow *et al.*[4] The sample on the screen was then washed four times with lukewarm water, dried under vacuum, and shadowcast with six mg. of chromium at shadowing angle approximately 12 degrees. The original micrograph was taken at a magnification of 5130.

Examination of the micrograph below revealed sev-

(*Continued on page 564*)

[1] RUBBER WORLD, 132, 471 (1955).
[2] *J. Applied Phys.*, 18, 273 (1947).
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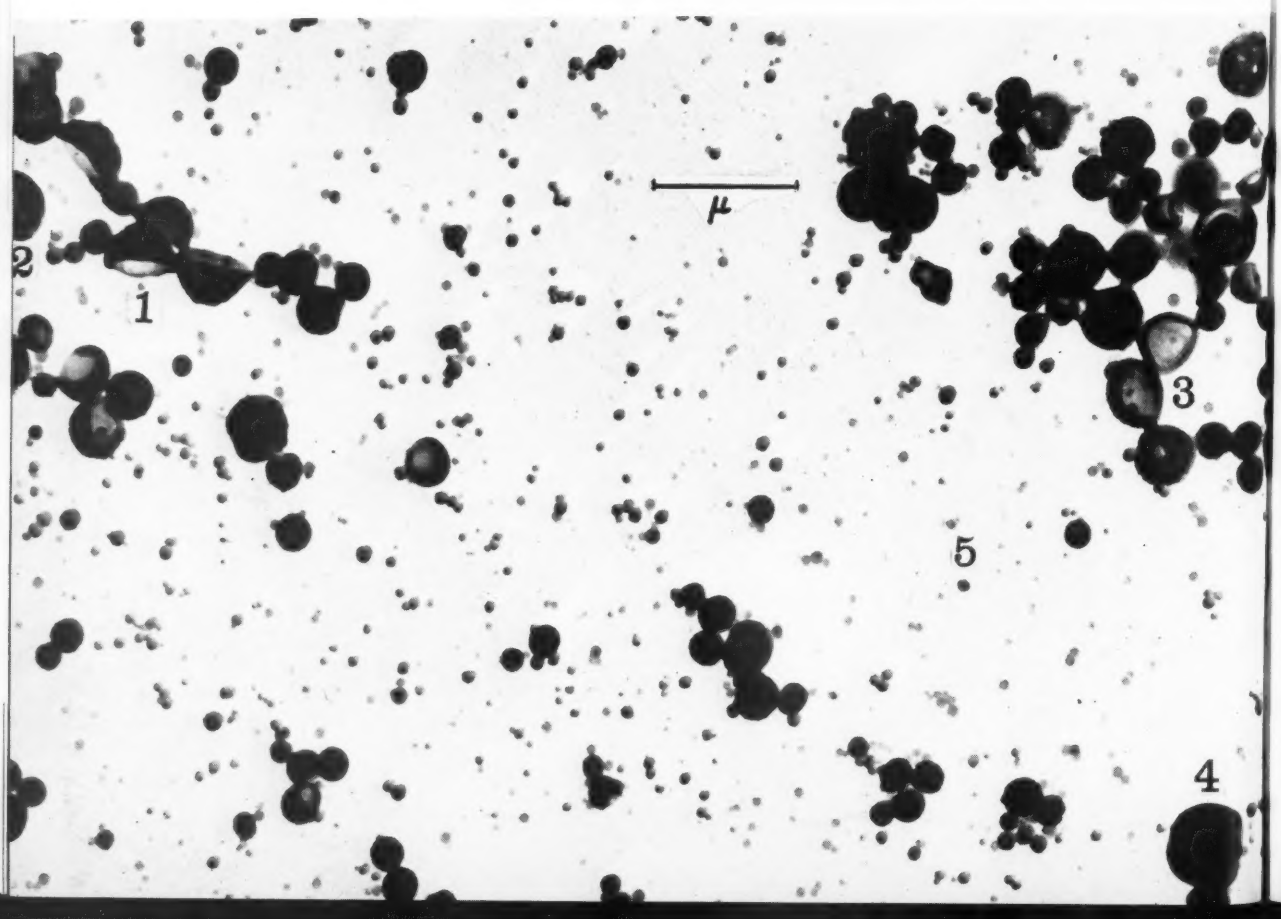
Electron microphotograph of high solids SBR latex showing large cup-shaped hemispheres and hollow spheres



Automatic Brushing Methods Speed Tire Processing

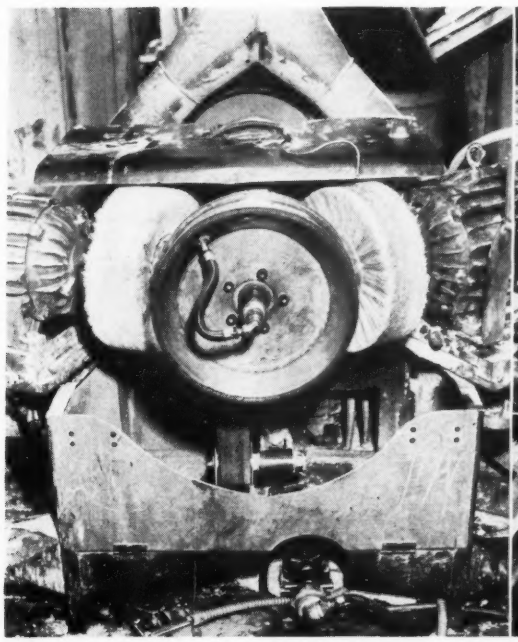


Fig. 1. White sidewall cleaning machine in the tire division of a major rubber company is equipped with two Osborn Tampico brushing units. Six 14-inch brushes make up each unit and rotate at 1800 rmp.

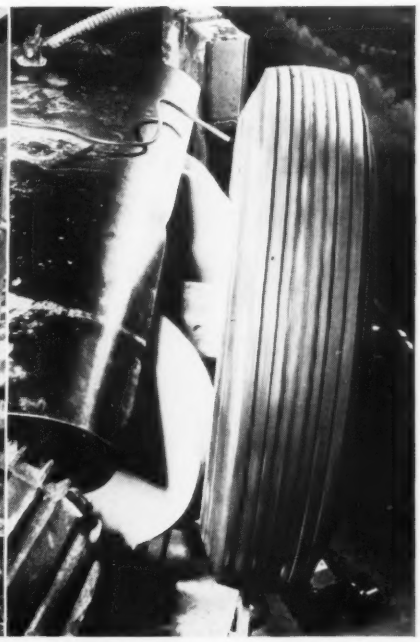


Fig. 2. Tire rotates on rim of white sidewall cleaning machine at 47 rpm. Cleaning sidewalls with brushes doubles production rate over former method

THE evolution of power brushing has made great inroads in the rubber industry within the last ten years. This widespread acceptance of power brushing is the result of this industry's effort to increase production at less cost, improve product quality, and maintain rigid production-line schedules.

In many of the larger rubber manufacturing plants, brushing methods developed in conjunction with Osborn Mfg. Co., Cleveland, O., have been installed as efficient production processes.

The production yield and effectiveness of a brushing operation are influenced by the type of brush used and the design of the machine.

For example: Equipment which automatically feeds parts to special-purpose brushes is capable of brush finishing parts at a much higher rate than a simple work fixture, such as a hand-held tool with a rotating brush attached. Each method is practical under varying circumstances, and one large rubber company employs both methods to advantage.

White Sidewall Cleaning

In the whitewall cleaning section of one producer, three special brushing machines were designed by company engineers in cooperation with Osborn engineers, to clean white sidewalls of tires after final processing.

Each machine consists of two motors equipped with horizontal spindles to accommodate two brushing units, one on each spindle. Each unit consists of six 14-inch-diameter Osborn Monarch Tampico brushes. Machines are also equipped with a wheel rim which has a quick-acting tire inflation valve in the center, and attachments to accommodate a vertical abrasive belt. This belt cleans the curb strip rim at the same time as the brushing operation on the white sidewall (Figure 1).

In the cleaning of the white sidewall of a tire after processing, the tire is manually placed on the holding rim of the machine and inflated. The tire is then rotated against the brushes. Cleaning is done quickly, easily, and effectively. Brushes rotate at 1,800 revolutions per minute in a counter-direction to the spinning tire. The tire revolves at 47 revolutions per minute. In this manner the brushes thoroughly clean the white sidewalls. During brushing, a continuous stream of air from a directed orifice keeps the mechanism clean. A 220-grit abrasive belt revolving at 3,600 revolutions per minute thoroughly removes white gum from the tire's curb strip,

giving the tire an even and attractive white circle (Figure 2).

The machines hold tire sizes ranging from 6.40 x 15 to 8.90 x 15. Production rate is more than 1,350 each 24-hour period, as against half that much by the previous method, which involved a two-step operation of abrading and then sheradizing.

The application of the Osborn brushing method of cleaning white sidewalls has resulted in increased production, better product appearance, higher quality uniformity, and a considerable savings in time and operating cost. Company engineers estimate that the operation using Osborn brushes has produced a sharper reduction in cost over methods previously used.

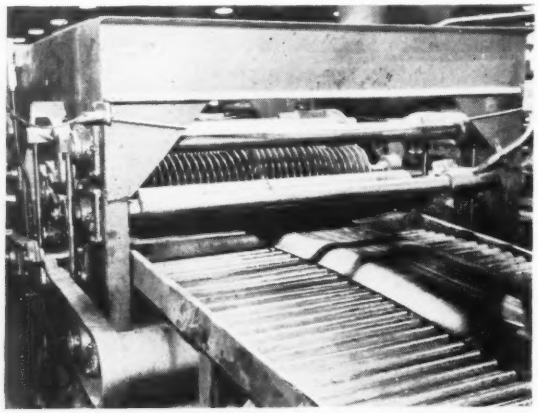


Fig. 3. Tread stock for heavy-duty truck, bus, and airplane tires is conveyed through tension rolls positioned above two rolls of Osborn brushes which thoroughly buff stock to create better adhesion between carcass and stock when tread is applied

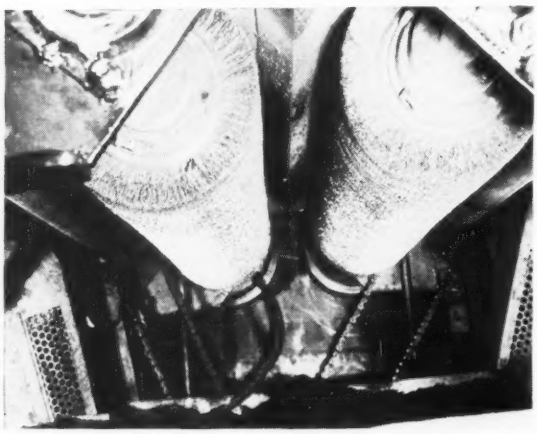


Fig. 4. Photo from underneath thread buffing machine shows brushing rolls. Each roll has 60 10-inch-diameter, 0.008 wire Osborn Monitor wire brushes. Rolls are 42 inches long

Tread Stock Buffing

In the buffing of sidewalls of flat tread stock prior to forming into aircraft tires, the stock is laid out on a table and roughed with an air-operated power-driven buffer equipped with a six-inch-diameter, 0.008-gage Osborn wire brush.

In an operation where only the sidewalls of the extruded tread stock are buffed, hand buffing proves to be fast and practical from both a time and cost standpoint. However, in buffing the entire tread compound, or stock used for heavy-duty bus and truck tires, a special tread buffing machine is used.

In this operation the extruded tread is placed on a gravity conveyor and run through tension rolls positioned above the buffing brushes (Figure 3). The entire tread stock is roughed to create better adhesion between carcass and stock when the tread is applied to the carcass.

Brushes used are 10-inch Osborn Monitor type, 0.008 crimped wire, 60 brushes to each roll. Each roll is 42 inches long (Figure 4).

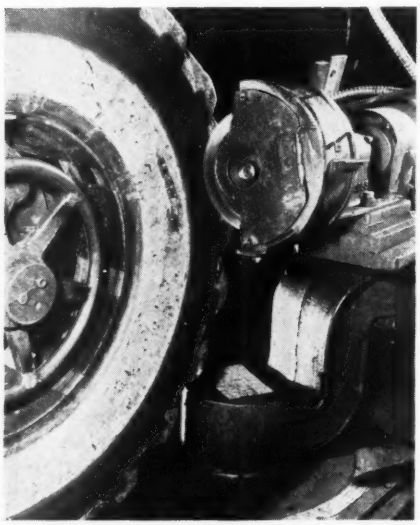


Fig. 5. Sidewalls of heavy-duty bus and truck tires which have been returned to the factory for residing and recapping are buffed by a special Osborn 12-inch-diameter wire brush

After the stock passes through the rolls, over the brushes and out the other side of the machine, it is held up on the ramp, and the tapered sides of the tread stock are hand roughed. The machine used here is a power-driven buffer equipped with six-inch diameter 0.008 wire brush.

Buffing stock and tapered sides by these methods is another means of saving time and labor costs. Labor fatigue is also greatly reduced.

Buffing Truck Tire Sidewalls

The Osborn brushing method also plays a roll of major importance in buffing sidewalls of heavy-duty truck, bus, and airplane tires which have been returned

(Continued on page 564)

Silicone O-Ring Mold Shrinkage Now Equal to That of Organic Rubbers

By BURTON B. WHITE
General Electric Co., Waterford, N. Y.

THE use of silicone rubber in O-rings has had more than a ten-year history, being a natural for those applications where resistance to temperatures has been needed beyond the capabilities of other elastomeric materials. One big difficulty, however, has faced the silicone rubber O-ring manufacturer until now, excessive shrinkage during vulcanization when compared with shrinkage experienced with organic rubbers.

Silicone vs. Organic Rubber Shrinkage

Most rubber stocks shrink 1.5 to 1.8% during vulcanization. Typical O-ring molds, designed for nitrile, neoprene, or butyl rubbers, are made to allow for about 1.6% shrinkage. Typical silicone rubber stocks shrank about 6% by the time the mold cure plus oven cure was completed, however, partly because of the higher coefficient of thermal expansion of this rubber and partly because of elimination of volatile components during the oven curing cycle needed to develop optimum compression set resistance. Special tooling designed just for silicone rubber was required—and special tooling is expensive.

In 1955 the standards and technical committee of the O-Ring Subdivision of The Rubber Manufacturers Association, Inc., undertook a study of the problem. In conjunction with this study, the Rubber Products Division of Parker Appliance Co. issued a report at the end of the year which concluded that, in the vast majority of cases, AN[1] specification tolerances could not be met with regular "high-shrinkage" silicone compounds. The report suggested further that a special set of tolerances be considered for silicone compounds, these tolerances being as high as twice the AN specification limitations.

Low-Shrinkage Silicone Compounds

In 1953 the silicone products department of General Electric Co. introduced the first so-called "low shrinkage" silicone rubber compound, SE-360. The shrinkage of this compound was 3%, which was a step forward, but it was not enough. SE-360 was the first compound designated by the new nomenclature for low compression-set silicone rubber, that is "Class 300."

Additional "Class 300" stocks in the form of SE-361, SE-371, and SE-381 compounds which exhibit the same shrinkage characteristics as organic rubber stocks were recently introduced by General Electric.[2] These stocks are available in commercial quantities as compounds ready for fabrication, or they can be compounded by the O-ring manufacturer from silicone gums in accordance with formulations supplied by G-E.

Practicability Demonstrated

The practicability of the new low-shrinkage compounds has been demonstrated by commercial use. Tens of thousands of O-rings have been molded and marketed into dozens of applications.

The fact that the new stocks do exhibit shrinkage equal to that of organic rubbers and that the same tolerances can be met out of the same molds has been demonstrated by an order for 4,000 O-rings to meet AN 6227-29 specification, filled by Garlock Packing Co. Half of the order was for 70 Shore hardness nitrile rubber rings, and half for silicone rubber rings.

All of these O-rings were molded by Garlock, using a 16-cavity mold designed for organic rubber. No special precautions were taken—standard commercial procedures were followed throughout. Press conditions for the nitrile rubber rings were 15 minutes at 320° F.; for the silicone rings, four minutes at 250° F., followed by four hours in a circulating air oven at 480° F.

Of the above 4,000 rings, 200 made of each-type rubber compound, or 10% of the total, were inspected for internal diameter with a projection comparator. The entire lot of 4,000 was inspected with a thickness gage for cross-sectional dimensions. *All of the O-rings met AN specification tolerances.* Not a single silicone O-ring had to be rejected for dimensional reasons (and very few for any reason).

In the accompanying graph typical distribution curves of measurements taken on O-rings made from earlier types of silicone rubber compounds are plotted with curves developed in the study of the new silicone rubber compounds compared with nitrile rubber compounds. The curve marked SE-450 represents data on O-rings made from "high-shrinkage" compounds; the SE-360 curve, data for rings made from the earlier so-called "low-shrinkage" compounds. Note the SE-371 and the nitrile rubber rings are both within the 0.210 ±0.005-inch specification. The SE-371 rings are all within ±0.003-inch, however, compared to the ±0.004-inch for the nitrile rubber rings.

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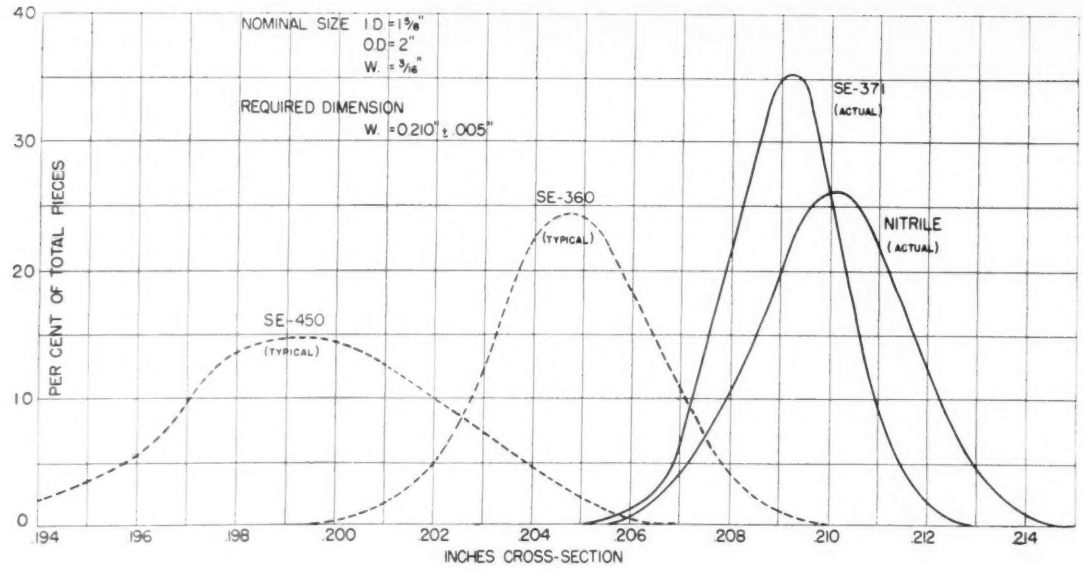
[1] Military specification, Wright Patterson Air Force Base, Wright Air Development Center, Dayton, O.

[2] "Product Data SE-361, SE-371, SE-381, Silicone Rubber Compounds," Silicone Products Department, General Electric Co., Waterford, N. Y. (Jan. 30, 1956).



Distribution of cross-section measurements for silicone and nitrile rubber O-rings

In all fairness it must be pointed out that the two dotted curves represent O-rings that were not vulcanized in the same mold or at the same time as the SE-371 and nitrile rubber rings, but the qualitative comparison remains valid.

Additional studies at Garlock have shown that in larger-size O-rings, where i.d. variation has been traditionally even a greater problem, tolerances can still be met with consistency. O-rings as large as 17 inches in diameter were molded successfully. The shrinkage factor remained essentially constant for all sizes of rings checked.

Results obtained at Garlock are typical of those reported from a number of O-ring molding plants, including Goshen Rubber Co., Parker Appliance, Precision Rubber Products, International Packings Corp., and others.

Visual Evidence

(Continued from page 560)

eral interesting observations. One was the peculiar shape of some of the large particles which appeared to range from cup-shaped hemispheres to hollow spheres. Typical examples are numbered 1, 2, 3 in the print. However, some large and some small particles numbered 4 and 5 did not cast a shadow.

It is believed that these particles had either sunk into the softened collodion film during the washing of the sample[4] or had flattened (in the high vacuum) owing to insufficient bromination. Another possibility is that during the washing procedure several of the particles may have passed through the openings in the collodion film and attached themselves to the bottom side of the film. Some of the large "hollow" particles appeared to contain smaller particles, and it is suggested that these may represent some intermediate stage in an agglomeration process.

No explanation of the nature or mechanism of formation of these "hollow" particles is advanced, but we are confident that their appearance is not explained by known techniques of electron microscopy.

The assistance of L. Gill and G. Vincent, of our electron microscopy laboratory is acknowledged. Thanks are due to Polymer Corp., Ltd., for permission to publish this electron micrograph.

Automatic Brushing Methods

(Continued from page 562)

to the factory for residing, and/or, recapping because of excessive wear.

Tires are placed on a sidewall buffing machine equipped with an Osborn 12-inch-diameter wire brush. This brush rasps sidewalls of tires that range in size from a small 8.00-SC, to the huge 24.00 x 29 earth-moving-equipment tire.

Regardless of size, the operation is a simple one. As the tire revolves slowly on the holder, the Osborn brush, especially designed for this type of a job, rapidly cuts away all old and worn sidewall rubber, leaving a cleanly roughed, uniform surface to which new rubber will easily adhere (Figure 5).

This method of preparing tires for new sidewalls is highly effective, not only from a cost and labor saving standpoint, but, here, labor fatigue is completely eliminated, and uniformity, which is highly essential in this operation, is attained.

EDITORIAL

The Future of Synthetic Polyisoprene

ALTHOUGH the successful duplication in the laboratory of the main constituent of *Hevea* natural rubber, *cis* 1,4, polyisoprene, has been accomplished, the commercial future of this synthetic polyisoprene seems mostly in the "future." The President's report to Congress of April 30 on "The Rubber Requirements and Resources of the United States" stated:

"This major scientific achievement in the field of rubber holds great promise for the future. In the normal course, processes will be studied in pilot plants, and improvements in processes worked out before any large-scale commercial production is undertaken. It appears unlikely that large-scale commercial production will be undertaken for the next few years.

"Although at least three companies are known to be working on polyisoprene rubber, the new synthetic offers no apparent threat to lower-price synthetics, at least for several years. However, the successful development of processes for the production of this new rubber would further reduce the dependence of this country on natural rubber."

The most recent results of the Firestone Tire & Rubber Co. on the application of its synthetic polyisoprene to heavy-duty truck tires, as published in this July issue of RUBBER WORLD, have confirmed the fact that this new polyisoprene is similar to *Hevea* and a potentially satisfactory replacement of *Hevea* in bodies and treads of heavy-duty truck tires. In addition, tire tests have shown that Firestone synthetic polyisoprene in passenger-car tires has tread cracking resistance *superior* to that of natural rubber.

Its application in certain mechanical goods uses also appears feasible. Blowout resistance (time to failure when subjected to high-frequency vibration) has been found greater than for *Hevea* rubber.

Pilot plants and semi-commercial production of synthetic polyisoprene are going to become actualities rather slowly, however, since the major commercial competition for synthetic polyisoprene is natural polyisoprene itself, and the latter's best-quality material can be marketed now for about half the price of the former.

Then there is the possible competition of *cis* 1,4 polybutadiene, the successful development of which was recently announced by Phillips Petroleum Co.

Butyl rubber is made by a similar contact catalytic process as is used for synthetic polyisoprene, and the producer for butyl rubber, the Standard Oil Co. of New Jersey, recently stated that this rubber is considered to be in competition first with natural rubber and then with other synthetics. *Obviously, competition with natural polyisoprene will eventually involve competition with synthetic polyisoprene.*

As far as the price and volume are concerned, synthetic polyisoprene at 50¢ or more a pound has been mentioned, and one estimate put possible production capacity at 50,000 long tons by 1960. At this or slightly higher levels of production, a price of 30¢ a pound is also considered possible. *A price of 30¢ a pound for synthetic polyisoprene, when and if it is realized, would mean real competition for natural rubber.*

The importance of cis 1,4 polyisoprene is that it represents a milestone in scientific achievement for the polymer and rubber chemist, and, as such, in the present-day modern world it is bound to have a successful future.

R. G. Seaman

EDITOR

Meetings and Reports

Schatzel Elected ASTM President; Other D-11 Officers Honored

The fifty-ninth annual meeting of the American Society for Testing Materials held at Chalfonte-Haddon Hall, Atlantic City, N. J., during the week of June 18, saw the election of one of the members of Committee D-11 on Rubber and Rubber-Like Materials to the presidency of the Society; the receipt of Society's Award of Merit to the chairman of D-11, Simon Collier, Johns-Manville Corp.; the retirement of the secretary of D-11, A. W. Carpenter, after 28 years of service as secretary of that committee; and the election of J. J. Allen, Firestone Tire & Rubber Co., to take Mr. Carpenter's place as secretary.

In addition, the Marburg Lecture was on the subject of "Industrial Chemistry, Properties, and Applications of Silicones," and, of course included information on silicone rubbers; it was given by C. E. Reed, General Electric Co. A symposium of the "Tension Testing of Non-Metallic Materials" included a paper on the tension testing of rubber by H. Tangenberg, of The B. F. Goodrich Co.

The Twelfth Exhibit of Testing and Scientific Apparatus and Laboratory Supplies featured displays by more than 40 suppliers, including Atlas Electric Devices Co., Baldwin-Lima-Hamilton Corp., Instron Engineering Corp., Tinius Olsen Testing Machine Co., Parr Instrument Co., Inc., Scott Testers, Inc., and Thwing-Albert Instrument Co.

R. A. "Rudy" Schatzel, Rome Cable Corp., newly elected president of the Society, received his B.S. from Union College in 1921 and his M.S. in 1923. On June 10, 1956, Union College conferred upon him the honorary degree of Doctor of Science. He has been associated with the wire and cable industry since 1924 and has been vice president and director of engineering of Rome Cable since 1945.

In ASTM, Dr. Schatzel has been particularly active in Committee D-11 and for many years was chairman of subcommittee 5 on insulated wire and cable.

During World War II he was very active on the War Production Board and in 1945 was made a member of the U. S. Technical Intelligence Committee which investigated German research in synthetic rubber.

Dr. Schatzel has written many technical papers, holds numerous patents, and has contributed to various textbooks in his field. His memberships include the American Chemical Society, Fellow of the American Institute of Chemists, American Institute of Electrical Engineers, American Society for Metals, American Association for the Advancement of Science, American Institute of Mining & Metallurgical Engineers Society of Naval Engineers, Editorial Advisory Board of RUBBER WORLD until his resignation on January 1, 1956, British Institute of Metals, British Institute of the Rubber Industry, and Insulated Power Cable Engineers Association.

Simon Collier received the Society's Award of Merit "in recognition of sustained support of ASTM technical and administrative work, particularly in Committee D-11 on Rubber and Rubber-Like Materials where as a long-time member and chairman since 1944 his knowledge and understanding have been so effective."

Mr. Collier received his B.S. degree in chemistry from Worcester Polytechnic Institute in 1916. He has been with Johns-Manville since 1923 and has been director of quality control since 1946. Mr. Collier has for years been a foremost proponent of the statistical approach to quality control and has long recognized the need of quality conscientiousness both at the operating level and at top management.

He has been a member of ASTM since 1926 and has been active on several committees, including D-11, of which he is currently chairman. He was a member of the board of directors of the Society from 1948 to 1951. Mr. Collier is a member of several other societies, including ACS, American Institute of Chemists, and the American Society for Quality, of which he is a founding member.

Committee D-11 Meeting

At the meeting of Committee D-11 on June 22, Chairman Collier presided and was assisted by Secretary Carpenter.

It was announced that because of the resignation of W. Newlin Keen, E. I. du Pont de Nemours & Co., Inc., as chairman of subcommittee 19, this post would be filled by F. H. Fritz, of the same company. Also, because of retirement, F. C. Thorn, Garlock Packing Co., has resigned as chairman of subcommittee 6, and this post will be taken over by Ralph Anderson, of Goodrich. Mr. Thorn was made an honorary member of Committee D-11 as a tribute to his long and valuable service to the work of the Committee.

C. W. Pickells, Consolidated Edison Co. of New York, was appointed D-11 representative on sectional committee C-59 on Electrical Insulating Materials of the American Standards Association.

A finance committee headed by Mr. Allen with I. D. Patterson, Goodyear Tire & Rubber Co., and Mr. Carpenter, will review the situation in connection with the secretarial expense of the Committee and decide on a means of providing for operating funds on a long-term basis.

The appointment of a research coordinator to provide for liaison with the research of the other committees of ASTM was approved.

The annual report and letter-ballot deadline of Committee D-11 will be advanced to several weeks from the June 22 meeting although the report and certain amendments were reported to the Society on June 22, subject to completion of the report.

The Society was advised that the D-11 report as preprinted did not allow enough time to complete its review and letter-ballot. Acceptance was recommended subject to completion of the letter-ballot. Because of certain negative ballots received by June 22 it was voted to amend the report, as follows:

1. Tentative Recommended Practice for Nomenclature for Synthetic Elastomers and Latices, as it appeared on page 38 of the D-11 preprint, will be expanded to cover other types of elastomers, provided retroactive letter-ballot in D-11 approves this.

New York Times

Simon Collier, D-11 chairman

R. A. Schatzel, ASTM president

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2. Tentative Recommended Practice for Description of Types of Styrene Rubbers, as it appeared on page 39 of the D-11 preprint, will be expanded as far as Table I is concerned to provide further classification of new polymers.

3. A change in the wording of the note pertaining to jacket materials in D296-49, Specifications for Cotton Rubber-Lined Fire Hose for Public and Private Fire Department Use, will be made.

It was decided to invite the International Standards Organization's Technical Committee 45 on Rubber to hold its meeting in the United States in November, 1959. If this invitation is accepted, the meeting will probably be held in Akron, O., and a committee will be appointed to handle the arrangements for this meeting.

In addition, if the ISO/TC 45 meeting in the United States in 1959 does materialize, it will be held the week before or after an International Rubber Technology Conference planned by rubber divisions of three technical societies for Washington, D. C., November 8-13, 1959. The Conference will consist of a three-day meeting of the Division of Rubber Chemistry, ACS; a one-day meeting of ASTM Committee D-11; and a one-day meeting of the Rubber & Plastics Division, ASME. The chairman of the rubber divisions or committees of these several societies, A. E. Juve, Rubber Division, ACS; Simon Collier, Committee D-11, ASTM; and R. G. Seaman, Rubber & Plastics Division, ASME, will designate members from their respective organizations as a committee to handle the arrangements for this conference since approval for such a meeting has been voted by the executive committees of these divisions and committees. Participation from abroad in the papers presented at this meeting will be solicited.

L. V. Cooper, Firestone Tire & Rubber Co., liaison representative of D-11 with the Federal Government services interested in rubber and rubber products, reported that he had been able to resolve one or two problems that had arisen in this connection since the last meeting of D-11.

A special tribute was paid to Dr. Schatzel on his election to the presidency of the Society and the occasion of his honorary degree from Union College.

The matter of a new subcommittee on radiation effects on elastomers was discussed, but since Committee D-20 on Plastics already has a subcommittee on radiation effects on plastics, D-11 deferred action for the moment.

Mr. Carpenter reported that the American Petroleum Institute had sent to D-11 a report on the testing of oil-well packings for consideration. The report will be reviewed, and participation of a representative of API in D-11 work will be solicited.

Mr. Cooper, nominating committee chairman, reported the following slate of officers for D-11 for a two-year term: chairman, Mr. Collier; vice chairman, H. G. Bimmerman, Du Pont; secretary, Mr. Allen. The officers were elected unanimously.

A tribute was paid to Mr. Carpenter on his retirement as secretary of D-11, and he was voted permanent membership as a member of the advisory committee of D-11 for life. At the meeting of the advisory committee and the subcommittee chairmen and others on the evening of June 21, additional tribute to Mr. Carpenter was made, and it was announced that a gift was being forwarded to his home in Akron as a small measure of appreciation for his 28 years of service as secretary of the D-11 Committee.

A. W. Carpenter, retiring D-11 secretary

The meeting was then turned over to Mr. Bimmerman as program chairman for the presentation of two papers before D-11.

Papers Program

The first paper on the program was entitled, "The Measurement of Elastomer Hardness at Low Temperatures," by M. Hanok, C. K. Chatten, J. Z. Lichtman, and T. A. Werkenthin, all of the U. S. Navy, Bureau of Ships. The paper was presented by Mr. Hanok.

It was stated that the Material Laboratory at the New York Naval Shipyard evaluated four spring loaded and seven dead-load hardness instruments at temperatures ranging from 74 to —65° F. Data was taken on several elastomers and included non-rigid vinyls and polyethylene. The Shore-type A durometer and the Material Laboratory indentometer were used as relative standards of comparison.

The spring loaded and dead-load instruments were considered as two separate and non-interchangeable classes of instruments. Based on the design features, the correlations between instruments of the same class, and the effect of low temperatures on the mechanical operation and on the reproducibility of hardness data, the Material Laboratory arrived at the following order of relative merit:

1. Among the spring loaded instruments, the Shore-type A durometer and the standard vernier-scale Rex gage are suitable for low-temperature use, with the Shore instrument being considered somewhat superior. The Wallace hardness meter is inferior to the Shore and standard Rex instruments and is unsuitable for use at temperatures as low as –65° F. The Rex dial-gage hardness tester is unsuitable for low-temperature use.

2. Among the dead-load instruments, the Material Laboratory indentometer, British Admiralty rubber meter, British Admiralty penetrometer, and the Tinius Olsen tester ranked first in suitability for use at temperatures as low as –65° F. The Pusey & Jones plastometer and the Aminco hardness tester ranked second. Although the Wallace hardness tester is not recommended for use at temperatures as low as –65° F., it may be used at temperatures down to –20° F., as a third ranking choice to the other dead-load instruments.

The second paper on the program was entitled, "Test Design for Decision," by E. M. Bader, Goodrich. It was first pointed out that during the past few years the use of statistical methods has increased greatly, and almost all members of private industry and government are using these methods in many forms. Unfortunately in the belief that wonders can be worked with all data, it has become common practice to experiment and consult statistical methods later.

Statistical methods of analysis provide unusual opportunities for an experimenter, it was added. Properly used, such methods can compensate for unwanted variables, accurately estimate random errors, and determine the "best size" for an experiment. Their use, however, must be planned for in the initial steps of designing an experiment. If they are used only as an afterthought, their usefulness in reaching a decision from data is reduced.

The speaker concluded with the hope that if his paper encouraged experimenters to seek more knowledge of statistical methods and to use them in designing experiments with more satisfactory decisions, his effort would be well repaid.

D-11 Subcommittee Meetings

Subcommittee 1—Hose. R. A. Bonnell, Goodyear, chairman. A proposal from the National Bureau of Standards covering methods of testing rubber hose was examined and discussed in connection with the March, 1956, subcommittee recommendations for D380-54T, Methods of Testing Rubber Hose.

The subcommittee agreed to prepare a new draft of D380-54T to include the March, 1956, subcommittee recommendations and additional recommendations of June, 1956, and to letter-ballot this new draft in the subcommittee. The major recommended changes follow:

1. The addition of instructions covering wire braided hose with regard to length change under pressure.

2. The addition of the test tube method of heat aging of rubber as described in D865-54T, Method of Heat Aging of Natural or Synthetic Rubber by the Test Tube Method.

3. Inclusion of additional details regarding methods of making tests for length change, twist, warp, rise, and expansion of hose.

4. The addition of a volumetric expansion test procedure.

5. The addition of procedures for low-temperature testing of complete hose and tube and cover.

The subcommittee also agreed to make a change in the wording of the note pertaining to jacket materials in D296-49, as requested by the Boston Woven Hose & Rubber Co. and United States Rubber Co.

Subcommittee 5—Wire and Cable. John T. Blake, Simplex Wire & Cable Co., chairman. The results of the recent letter-ballot, liaison with subcommittee 16 of Committee D-11 and with Committee D-20, and addition of revised and enlarged braid specifications to D1350-54T, Specifications for Construction of Rubber Insulated Wire and Cable, were first discussed.

There was also a considerable discussion of the use of statistical methods in connection with testing and the relation to future changes in subcommittee 5 specifications. An attempt will be made to have a paper on statistical methods presented before the subcommittee at the next meeting and also to suggest that a paper also be presented before the next meeting of Committee D-11 on this same subject.

The introduction of corona test methods in D470 54T, Methods of Testing Rubber and Thermoplastic Insulated Wire and Cable, and D1350-54T, will be considered.

The subcommittee voted unanimously to extend to one of its members, R. A. Schatzel, heartiest congratulations and best wishes on the occasion of his election as president of the Society and also on his receipt of an honorary degree of Doctor of Science from Union College.

Subcommittee 6—Packings. F. C. Thorn, chairman. The meeting of this subcommittee was devoted entirely to consideration of a revision of D733-53T, Methods of Testing Compressed Asbestos Sheet Packing, as proposed by George D'Olier, Raybestos-Manhattan, Inc.

The proposed revision has as its purpose enabling the members of the SAE-ASTM Technical Committee on Automotive Rubber to use the methods more readily, and to eliminate some internal inconsistencies in D733-53T.

The complete revision was submitted to Committee D-11 for adoption, subject to retroactive letter-ballot.

Subcommittee 7—Rubber Latices. G. H. Barnes, Goodyear, chairman. A method of test for the color of uncured, dried films of latex rubber, as proposed by the British Standards Institution, was reviewed, but little interest was shown by the subcommittee, and no further action is contemplated.

A task group which reviewed methods for the determination of volatile fatty acids recommended a modified version of a method proposed by the Rubber Research Institute of Malaya. The subcommittee will submit this method to Committee D-11 for letter-ballot.

An evaluation of three methods of determining latex density showed good agreement when applied to centrifuged latex. BSI reported difficulty with these methods when applied to creamed latex. A task group was therefore appointed to study the application of these methods to determination of the density of creamed latex.

The present D1076-54T, Specifications and Methods of Test for Concentrated, Ammonia Preserved, Creamed and Centrifuged Natural Rubber Latex, does not include any classification for latices with low ammonia content. The addition of specifications for Type III centrifuged natural latex preserved with a small amount of ammonia and other necessary preservatives, and Type IV, creamed natural latex preserved with a small amount of ammonia and other necessary preservatives, will be submitted to letter-ballot in Committee D-11.

These two new types of latices conform to the present specification requirements for Types I and II except that total alkalinity calculated as ammonia in Types III and IV shall not exceed 1.0% based on the water phase. The minimum ammonia contents of Types I and II on the same basis is 1.6%.

The wording of the instructions in D1076-54T for the determination of KOH number will be clarified and then submitted to letter-ballot in Committee D-11.

Subcommittee 8—Nomenclature. Harry L. Fisher, University of Southern California, chairman. No meeting of this subcommittee was held, but it was announced that the "Glossary of Terms Relating to Rubber and Rubber-Like Materials," ASTM STP 184, would be available in August from Society headquarters.

Subcommittee 9—Insulating Tape. C. W. Pickells, chairman. A task-group report on revision of procedures for sampling, accepting or rejecting friction, rubber insulating and ozone resistant tape was presented.

The subcommittee will letter-ballot a proposal to select sample rolls from whole shipments (a shipment not to exceed 5,000 rolls) instead of dividing the shipments into lots and sampling each lot. Acceptance or rejection would then be by "shipment" instead of by "lot."

The subcommittee rejected a proposal to divide measurements and tests into two categories: one of "major" importance which would require retest for all requirements in the event the samples fail to meet one or more specifications; the other of "minor" importance which would require retest only for the specifications not met on the first test. The present procedure which requires retesting only the characteristics where failure occurred is considered satisfactory.

The subcommittee will consider a proposal to add a requirement for moisture absorption in the specifications for rubber tapes.

Subcommittee 10—Physical Testing. L. V. Cooper, chairman. The letter-ballot in the subcommittee on the strain testing of rubber was favorable, and the method was therefore recommended for letter-ballot in Committee D-11.

The D-11 letter-ballot on the testing of O-rings was discussed, and it was decided that the matter of proper-type testing machine clamps and their possible mechanical rotation should be investigated further. A task group was appointed under R. F. Tener, NBS.

The report on methods of calibrating tensile testing machines was not conclusive, and this task group will continue its investigation under the chairmanship of D. C. Scott, Jr., Scott Testers, Inc.

Subcommittee 11—Chemical Analysis. W. P. Tyler, Goodrich, chairman. A discussion of three possible methods of analysis of sulfur in rubber compounds was held.

A study of the pyrolysis method of analysis for carbon black in rubber compounds is being made by a task group.

A study of extraction methods for synthetic rubbers and of recent new methods for the determination of lead and zinc in rubber compounds will be made.

Methods of chemical analysis of synthetic rubber submitted by subcommittee 13 on synthetic elastomers will also be reviewed.

Subcommittee 12—Crude Natural Rubber. Norman Bekkedahl, NBS, chairman. A progress report was presented by L. G. Mason, Goodrich, chairman of the task group on test methods and specifications for crude natural rubber. It was the opinion of the task group that test methods should be made available by ASTM for all of the proposed natural rubber specifications.

ASTM procedures are already available for dirt content, ash, copper, manganese, and rubber hydrocarbon. ASTM procedures will soon be available for volatile matter, cure index, and stress-strain properties.

The task group asked for authority to accumulate the necessary data for the establishment of proper tentative specification limits for #1 and #1X Ribbed Smoked Sheets and #1 and #1X pale crepes.

After considerable discussion the report of the task group was accepted. A motion was passed to change the scope of the proposed tentative specifications from the following:

"These specifications apply to first-grade natural rubber of the following types: Type I—Smoked Sheets, and Type II—Pale Crepe. These specifications are not necessarily applicable to any RMA or Singapore grade, and shall not be construed as limiting the desirability or usefulness of other types of natural rubber" *to*

"These specifications apply to natural rubber of the following types: #1 and #1X RSS (Standard and Superior Quality, respectively of ribbed smoked sheets) and #1 Thick or Thin and #1X Thick or Thin Pale Crepes (Standard and Superior Quality, respectively) as defined by RMA Type Descriptions (or International Standards when adopted)."

It was recommended that the task group concentrate its initial studies on smoked sheets.

H. C. Bugbee, president of the Natural Rubber Bureau, read a letter to the chairman and members of subcommittee 12 in which he registered the protest of the Rubber Producers' Council of Malaya against any action by ASTM with regard to specifications on natural rubber in view of the impracticabilities involved in the producing and shipping areas.

W. J. Sears, vice president of The Rubber Manufacturers Association, Inc., and chairman of the RMA Crude Rubber Committee, agreed with the proposal that ASTM test methods be used by consumers of natural rubber to obtain data from which tentative specifications might be prepared, eventually.

Subcommittee 13—Synthetic Elastomers. B. S. Garvey, Jr., Sharples Chemicals

Division, Pennsylvania Salt Mfg. Co., chairman. L. G. Mason, Goodrich, chairman of the section on sampling, reported that the subcommittee letter-ballot on the size of the random sample was favorable for everything except for the size of the sample to be used for the Mooney viscosity test. D927-53T, Method of Test for the Viscosity of Rubber and Rubber-Like Materials by the Shearing Disk Viscometer, calls for a 200-gram sample, and the previous Federal Facilities Corp. specification required a 250-gram sample. It was agreed to change the sample size in the ASTM method to 250 grams.

Two sampling plans for obtaining samples for the determination of volatile matter in styrene-butadiene rubbers were suggested. Dr. Garvey asked members of the subcommittee to evaluate these two plans and send their results to Mr. Mason.

B. C. Pryor, Goodrich-Gulf Chemicals, Inc., head of the section on chemical tests, stated that procedures for certain new tests have been prepared and are now being evaluated. These new tests include oil content and alkyl-phenol antioxidant content in oil-extended rubbers.

L. V. Cooper reported that the responsibility for revision of D15-54T, Methods of Sample Preparation for the Physical Testing of Rubber Products, had been assumed by subcommittee 29. It was decided, however, that section 3 should cooperate with subcommittee 29 in the revision of D15-54T.

I. D. Patterson, head of the section on latex tests, reported that publication of the tentative methods of test for synthetic rubber latices will about complete the work of his group. Any changes in these methods are expected to be editorial in nature.

R. G. Seaman, RUBBER WORLD, head of the section on nomenclature, reported on the results of a letter-ballot in the subcommittee, the purpose of which was to propose a broader and more comprehensive system of nomenclature and definitions for commercial synthetic rubbers and natural rubber. The voting was about 25 affirmative and five negative for the three sections of the letter-ballot, and the negative votes were explained as vague and possibly due to lack of understanding of the intent of the proposal. The subcommittee voted to recommend to Committee D-11 that it replace the Recommended Standard Practice for Nomenclature for Synthetic Elastomers and Latices on page 38 of the annual report of Committee D-11 with the system proposed in the letter ballot of May 1, 1956, deleting the S designation in section 2 and the DSBR designation in section 3, subject to retroactive letter-ballot.

W. M. Otto, Firestone, reporting for the section on standard reference material, stated that the standard lot of styrene-butadiene rubber (SBR) had been prepared, and that plans were under way for testing by the laboratories of 13 companies and NBS.

G. C. Maassen, R. T. Vanderbilt Co., head of the section on code numbers, stated that the producers should have the right to decide when a new polymer was entitled to consideration as a standard ASTM polymer. The subcommittee voted that the producer would have to present data to justify the assignment of a number to a new polymer to transfer it to the classification of a standard ASTM polymer.

The subcommittee also recommended for letter-ballot in Committee D-11 an expansion of the system of numbering the new polymers of the various producers so that in any series of numbers, from 3000 to 9499, as assigned to various producers in groups of 500, the following subclassifications would be used in each producer's group of 500 numbers: 0-49, hot polymers; 50-99, hot black masterbatch; 100-149, cold polymers; 150-199, cold black masterbatch; 200-249, cold oil-extended polymers; 250-299, cold oil-black masterbatch; 300-349, hot latices; 350-399, cold latices; and 400-499, unassigned.

The subcommittee asked Committee D-11 to delegate authority to subcommittee 13 for the direct assignment of polymer designations.

It was also voted that all producers be notified by means of a letter, signed by both the chairman of subcommittee 13 and the chairman of Committee D-11, of all recent actions concerning numbering systems.

Subcommittee 15—Life Tests. G. C. Maassen, chairman. The report of the section on the correlation of oven aging with shelf aging of rubber compounds indicated that after eight years the tensile properties, as measured by modulus change, are leveling off. It was estimated that within another four years the samples stored in the United States will have reached a level of change equal to the level of change of the samples which have been stored in Liberia for eight years. It was decided that the work on this problem be concluded after 12 years' exposure of the samples, or four years hence.

No better method of evaluating the light source in the Weatherometer and Fadeometer testing machines than that presently prescribed has been found. It was decided to await the completion of work of Committee D-20 along these lines.

D750-55T, Method of Test for Resistance to Accelerated Light Aging of Rubber Compounds, will be rewritten to conform with E42-55T, Recommended Practice for Operation of Light and Water-Exposure Apparatus (Carbon-Arc Type) for Artificial Weathering Test.

Fifteen Mast ozone testers have now been completed, and a round-robin test program to evaluate these machines is planned prior to the next meeting of the subcommittee.

The subcommittee chairman reported that tests made in connection with the tensile aging of rubber compounds in air ovens in which the rate of air change was varied between zero and 250 changes per hour showed no effect on degradation of tensile properties, over this range of air changes. This information was given to R. D. Stiehler, NBS, for transmittal to ISO/TC 45 on Rubber. These results are in agreement with those previously provided by ISO/TC 45.

Work on the revision of D518-44, Method of Test for Resistance to Light Checking and Cracking of Rubber Compounds, is still in progress.

Subcommittee 16 — Classification and Specification of Rubber Compounds. J. F. Kerscher, Goodyear, chairman. A letter to the subcommittee chairman from Fred Thorn, Garlock Packing, had been circulated to the entire subcommittee and was first discussed.

Mr. Thorn made the following points in connection with the work of subcommittee 16:

"The function of this subcommittee is merely to set up a system of descriptions and classifications applicable to all rubber compounds. It has nothing to do with specifications. The wire and cable subcommittee will continue to write specifications applicable to the component parts of their individual products, taking the appropriate line in the tables as a basis. The hose subcommittee will, if it desires, write specifications for various types of hose, picking their hose cover and tube stocks from the master tables."

Mr. Thorn then asked the following questions in his letter:

"What is your objection, if any, to the D735-54T system considered solely as a basis of description and classification? What do you propose to substitute for it?"

As a result of a discussion of Mr. Thorn's letter, the following actions were taken by the subcommittee:

1. A change was made in the title of subcommittee 16 to "Description and Classification of Rubber Compounds."

2. A change was made in the scope of the subcommittee, as follows: "To prepare a system for description and classification of rubber compounds for general use."

3. Reference to cooperation with ISO/-TC 45 on Rubber will be deleted from the original scope since such procedure is presumed to be automatic.

4. A task group will be appointed to iron out the present differences of opinion and recommend a generally acceptable system for the description and classification of compounds for general use. The chairman of the subcommittee will designate the members of the task group in the near future.

A questionnaire to determine the American attitude toward the proposal of Working Group #6 of ISO/TC 45 represented by Document 252 was circulated in the subcommittee.

Fourteen replies were received, and it was apparent that there were some items in the WG #6 proposal on which there was general agreement, *but* there were also several items on which there was considerable disagreement.

The chairman of the subcommittee asked that additional replies to this questionnaire be forwarded by July 21. After that date the replies will be forwarded to WG #6 of ISO/TC 45 for its examination and consideration.

Subcommittee 17—Hardness, Set, and Creep. S. R. Doner, Raybestos-Manhattan, chairman. The ISO/TC 45 Recommendation #50 for determining the hardness of rubber will be published in the 1956 ASTM Committee D-11 handbook, and the subcommittee chairman asked that this method be used as much as possible so that comments based on experience may be available at the next meeting.

The round-robin test program on the comparison of the various hardness test-

ing instruments has been completed, and the data are now being evaluated by subcommittee 28 on statistical methods.

It was announced that a maximum reading Shore durometer is now available from Shore Instrument Co.

Testing Machines, Inc., announced that it is handling the distribution of a microhardness testing instrument manufactured in England.

Subcommittee 17—Flexing Tests. H. Tangenberg, Goodrich, chairman. Subcommittee 17 requested Committee D-11 to maintain D430-51T, Methods of Dynamic Testing for Ply Separation and Cracking of Rubber Products, as tentative because of impending changes, advance D623-52T, Methods of Test for Compression Fatigue of Vulcanized Rubber, to standard at the next annual meeting; retain D813-52T, Method of Test for Resistance of Vulcanized Rubber or Synthetic Elastomers to Crack Growth, as tentative because of impending changes; and retain D1052-55, Method of Test for Resistance of Vulcanized Rubber or Synthetic Elastomers to Cut Growth by Use of the Ross Flexing Machine, as standard.

The changes listed by Dr. Stiehler in D430-51T and D813-52T were approved by a task group, thus bringing these methods in conformance with ISO/TC 45 Documents 258 and 257, respectively. These changes will be submitted to letter-ballot.

Subcommittee 19—Tests for Properties of Rubber and Rubber-Like Materials in Liquids. W. Newlin Keen, chairman. Task group A continues to have difficulty in coming to a firm decision on the reproducibility of tests conducted at temperatures of 250° F. and above, as described in D471-54T, Methods of Test for Change in Properties of Elastomer Vulcanizates Resulting from Immersion in Liquids.

Mr. Thorn recommended that subcommittee 19 give consideration to a new tentative method of test for change in length of an elastomeric vulcanizate resulting from immersion into a liquid. This new method is made up of Method B of D471-54T and a method developed by Mr. Thorn. It was voted to letter-ballot the proposed new method in the subcommittee.

The subcommittee chairman reported on the outstanding differences between ISO/TC 45 Draft 238 entitled, "Testing the Swelling of Vulcanized Rubber," and D471-54T. He will determine if ISO/TC 45 is expecting a report on Draft 238 from Committee D-11.

Mr. Keen thanked the subcommittee members for their participation and cooperation during his chairmanship.

Subcommittee 21—Cements and Related Products. J. F. Anderson, Goodrich, chairman. It was decided by a previous letter-ballot to add the Brookfield viscometer to D553-42, Methods of Test for Viscosity and Total Solids of Rubber Cements. J. P. Sanders will prepare a method of test with this instrument to be circulated in the subcommittee for approval.

It was recommended that D816-51T, Method of Testing Rubber Cements, be advanced to standard at the next annual meeting in 1957.

A request for clarification of the meaning of the peel test in D903-49, Method of Test for Peel of Stripping Strength of Adhesives, will be forwarded to Committee D-14 on Adhesives by the chairman of subcommittee 21.

In connection with D1205-53T, Methods of Testing Adhesives for Brake Lining and Other Friction Materials, it was suggested that there was a need of cooperation between SAE subcommittee 7 and ASTM D-11 subcommittee 21. The chairman of subcommittee 21 has requested information regarding possible formation of a section in SAE-ASTM Technical Committee A to coordinate the work of these two groups.

The impact test is to be investigated further by General Motors Research before circulation in the subcommittee is considered, including a study of the test in connection with bonds between friction materials and metals.

Another new test under consideration for addition to D1205-53T is the bend test which will be circulated in the subcommittee for approval.

Brooks Studio

H. G. Bimmerman, D-11 vice chairman

Subcommittee 22—Cellular Rubbers. H. G. Bimmerman, chairman. A. W. Carpenter, D-11 secretary reported that there had been no dissenting votes in the D-11 letter-ballot on D1055-54T, Specifications and Methods of Test for Latex Foam Rubbers, and D1056-54T, Specifications and Methods of Test for Sponge and Expanded Cellular Rubber Products. The latest versions of these specifications will be forwarded to SAE-ASTM Technical Committee A for incorporation in the SAE handbook.

C. S. Yoran, Brown Rubber Co., reported that SAE-ASTM Technical Committee A had several comments on the draft of vinyl from specifications of the Society for the Plastics Industry, and these comments were being forwarded to that Society. The chairman of subcommittee 22 will also forward comments and state they are in agreement with those of the Tech A committee. As soon as SPI rewrites this specification, subcommittee 22 will expedite its inclusion in the Committee D-11 handbook.

Mr. Barnes submitted copies of the SPI preliminary, tentative specifications for urethane foams and emphasized the preliminary nature of these specifications. At present the temperature-humidity aging method has not given uniform results and cannot be considered as satisfactory for specification use. Work is under way in order to attempt to determine the cause of these variations. The SPI urethane foam specifications will be sent to all members of subcommittee 22 for comments and suggestions.

A comparison of testing methods using the inclined plane tester and the Instron machine for foam and sponge will be made.

A Bureau of Ships report on the Pandux tester will be sent to members of subcommittee 22 interested in this report if the request is addressed to C. K. Chatten, New York Naval Shipyard, Materials Laboratory, Brooklyn, N. Y.

Subcommittee 23—Hard Rubber. W. F. Dermody, Stokes Molded Products Co., chairman. A report on the status of work on an impact test for hard rubber was made. Work in Committee D-20, subcommittees 17 and 19, was discussed. The interest in an impact test is centered in subcommittee 23 of Committee D-11 because this subcommittee is concerned with materials of a rigid rather than elastomeric character.

A proposal for revision of the falling-weight impact test in D530-50T, Methods of Testing Hard Rubber Products, will be letter-balloted in the subcommittee. The proposed revision is suitable for proof or product testing only and is not intended to provide a source of design or strength of materials data. A task force will continue work, however, toward obtaining a method suitable for both latter purposes.

A draft of a method for determining hardness with the Shore D durometer will be prepared for the next meeting for consideration as part of D530-50T.

An editorial change in the description of the hot-cold cycle test in D639-52T, Methods of Testing Asphalt Composition Battery Containers, will be circulated within the subcommittee for approval at the same time as the letter ballot on revisions in D530-50T.

A task group has been appointed to bring together available data on the acid solubility test round-robin.

In order to encourage greater participation in the work of subcommittee 23, 12 of the largest producers of automotive batteries and water meters will be invited to send representatives to participate in the work of the subcommittee.

H. Peters, Bell Telephone Laboratories, expressed a desire on the part of consumers of hard rubber products for a definitive material specification classifying available materials in terms of recognized and readily distinguishable grades.

A draft of British Standard CW (RUC) 1213 for the determination of plastic yield of ebonite has been received for comment through the Society from BSI. Copies will be circulated within the subcommittee for comments.

The definitions of hard rubber in D530-50T and in the forthcoming ASTM

Glossary of Terms were discussed, but it was decided not to take any immediate action, but to consider this subject at a later date to avoid confusion at this time.

Subcommittee 24—Coated Fabrics. K. L. Keene, U. S. Rubber, chairman. The request of Northrop Aircraft, Inc., for investigation of adhesion properties of coated fabrics by the use of the Stoll flex abrasion machine was not approved because data indicate that this machine is not suitable for the determination of adhesion.

The following changes in D751-52T, Method of Testing Rubber-Coated Fabrics, were submitted for letter-ballot in Committee D-11:

1. Paragraph 6—Weight. Insert after "weighed on a calibrated scale" the words "to an accuracy of 0.25%." This change applies to both the "a" and "b" methods. Also, add to both the "a" and "b" methods, "The weight shall be reported in ounces per linear yard or ounces per square yard to the nearest 0.1 ounce."

2. Paragraph 28 — Hydrostatic Resistance. Delete the wording "modified diaphragm bursting tester (Mullen test)" and insert "Mullen-type hydrostatic tester."

3. Paragraph 29—Testing Machine. Reword "a" to describe in detail the requirements for the machine and delete "b" and "c."

4. Paragraph 31 — Procedure. Make minor changes in wording so as to clarify procedure.

A progress report from the task group working on low-temperature resistance was presented, and the group was requested to continue its study and include additional methods and materials.

A progress report from the task group on adhesion tests was also presented, and a report on a round-robin test program is expected at the next meeting.

Task groups for work on oven aging methods and Fadometer and Weatherometer aging were appointed.

Subcommittee 25 — Low-Temperature Tests. R. S. Havenhill, St. Joseph Lead Co., chairman. Irving Kahn and R. E. Ofner, of Army Ordnance, discussed the various factors involved in trying to make the proposed ISO/TC 45 low-temperature hardness test (MLI instrument) conform with the ISO/TC 45 room-temperature test (Wallace instrument). Copies of report 56-1759 were distributed in which the MLI and Admiralty instruments were compared in tests on 11 stocks at room temperature and at —40° F. Both instruments showed equal precision.

W. A. Frye, Inland Mfg. Division, General Motors Corp., presented a report showing that the present ISO instrument (Wallace) became entirely inoperative at —65° F. Information in this report included data on seven stocks at temperatures as low as —65° F. obtained with the Shore A durometer, Wallace hand meter, and the Wallace dead load meter.

It was agreed that the Wallace ISO room-temperature tester could not be used for low-temperature work, and that the standard ISO room-temperature hardness method should be revised by deleting the section which requires an attached built-in foot. This change would allow use of the Admiralty instrument with a separate foot for both room- and low-temperature determinations. Dr. Stiehler was requested to contact J. R. Scott, of ISO/TC 45, in connection with this recommendation.

It was also agreed that repeat tests using double the major and minor loads will be run by Mr. Ofner, and the temperature range will be extended to —65° F. Tests will also be run in liquid media.

A report on the effect of speed of testing on brittleness temperature was presented, and additional work will be done, and the results forwarded to the chairman of subcommittee 25.

Subcommittee 28 — Statistical Quality Control. E. S. Bader, Goodrich, chairman. The work of this subcommittee of reviewing data in conjunction with other subcommittees is continuing. The recent major effort of the subcommittee, "The Recommended Tentative Practice for Interlaboratory Experiments," has been completed and submitted to letter-ballot in Committee D-11.

The problems related to describing sample sizes and their interpretation in connection with Committee D-11 methods, procedures, and specifications were reviewed. A section was appointed to review these problems and the related conditions of D-11 specifications. Also, another section was appointed to perform a similar task on D-11 methods and procedures. A report of these two sections is expected to be presented at the spring meeting of Committee D-11.

Subcommittee 29—Compounding Ingredients. A. E. Juve, Goodrich, chairman. A task group which had investigated the possible advantage of using reference carbon blacks for comparisons with samples of "unknown" blacks reported that the use of reference blacks was desirable and recommended that their use be spelled out in the method to be written on the testing of blacks in rubbers. The use of two remills following the original mix is to be investigated further by the same task group.

Another task group which had been varying the mill mixing procedure and the Banbury mixing procedure in an attempt to obtain closer agreement between these two methods reported that its study which involved temperature variations only failed to show how closer agreement could be obtained. In view of the report of the task group on reference black, however, it was decided that it was not necessary to pursue the mixing problem any further.

J. J. Allen, D-11 secretary

A third task group has been working on a series of changes now required in D15-54T, which include bringing the reference materials up to date, the addition of one new recipe (the ACS recipe #1 for testing natural rubber), and numerous other minor changes. These changes will be letter-balloted in the subcommittee.

An attempt will be made by subcommittee 29 to develop procedures for compounding mixing, etc. for the synthetic rubbers as replacements for the FFC procedures. This work will be done in cooperation with subcommittee 13 and may result in further changes in D15-54T or a separate method.

SAE-ASTM Technical Committee A

A report on the activities of the SAE-ASTM Technical Committee on Automotive Rubber was made by J. J. Allen, secretary of that committee. The following actions have been taken since the last meeting of Committee D-11 in March:

1. The round-robin tests on duplicability of results obtained with the Yerzeley oscillograph have been completed, and Tech A has recommended to ASTM D-11 subcommittee 27 that D945-52T, Methods of Test for Mechanical Properties of Elastomeric Vulcanizates under Compressive or Shear Strains by the Mechanical Oscillograph, be revised to show the degrees of accuracy normally expected, as follows: resilience, ±0.15%; static modulus, ±5 psi.; dynamic modulus in compression, ±25 psi., and dynamic modulus in shear, ±10 psi.

2. Several changes in the SAE 20R coolant hose specifications have been approved by section III and are now being letter-balloted in Tech A. They include a condensation of the various tables into one table; some changes and additions to sizes and bursting strength requirements; also, some rewording of the titles and scope of the various types of hose.

By letter-ballot of Tech A, ASTM Committee D-11 will be asked to approve a revision of D1171-51T, Method of Test for Weather Resistance Exposure of Automotive Rubber Compounds, to provide an alternate procedure for measuring and reporting the quality retention values of rubber compounds after exposure to weather aging.

Quebec Group Field Day

The annual Field Day of the Quebec Rubber & Plastics Group, Montreal, P.Q., Canada, was held at the Granby Golf Club, June 1, with 60 members and guests participating in golfing activities and more than 100 attending the evening dinner. Edward Gibbon, Canadian Industries, Ltd., won the low gross prize for members; while the low gross prize for visitors went to Stu Murray.

New Polymers Featured at Cleveland Rubber & Plastics, ASME, Meeting

The Rubber & Plastics Division of the American Society of Mechanical Engineers held a one-day meeting at the Hotel Statler, Cleveland, O., on June 18, as part of the semi-annual meeting of the Society. The theme of the Division's meeting was "Engineering Properties of New Rubbers and Plastics," and two sessions took place: one on rubbers, and one on plastics.

There was a luncheon-meeting of the executive, advisory, and general committees of the Division at which plans of the Division for participation in the annual meeting of the Society in New York in November and other business were discussed. R. G. Seaman, 1956 Division chairman, explained that the Division has been asked to participate in an International Rubber Technology Conference in Washington, D. C., in November, 1959, along with the Division of Rubber Chemistry of the American Chemical Society and the D-11 Committee on Rubber and Rubber-Like Materials of the American Society for Testing Materials.

Technical chairman for the Division's Cleveland meeting was Maurice Morton, University of Akron. His summary of the papers presented at this meeting is given below. Chairman and vice chairman for the two sessions are also indicated.

Plastics Session

Selby Skinner, Case Institute of Technology, was chairman, and William R. R. Park was vice chairman of this session.

"Weather Aging of Colored Styrene Plastics" by Roland J. Bourke, Herbert C. Wood, and J. R. Taylor, Monsanto Chemical Co., plastics division, was the first paper on the program.

The authors presented data to show the effects of dyes and pigments on the weather resistance of polystyrene. The properties examined included tensile strength, flex cracking resistance, impact strength, dielectric properties, and yellowing. The results indicate a beneficial effect from the incorporation of colorants; pigments show the more pronounced effect.

Weather resistance improved substantially with increasing concentrations of pigments up to a maximum of 20 parts per hundred of styrene studied, but at a sacrifice of up to 30% in initial performance.

"Properties and Applications of an Ethylene Polymer," by R. Vernon Jones and M. W. Davidson, Phillips Chemical Co., and Paul J. Boeke, Phillips Petroleum Co., was the second paper on the program.

In this paper the authors presented data on the special properties and applications of their new, low-pressure, highly crystalline polyethylene called Marlex 50. This material has considerably different properties from the usual, flexible polyethylene, specifically high strength and rigidity, and a much wider temperature range of operation. It also has a markedly greater solvent resistance, apparently due to its highly crystalline "isotactic" structure. These properties suggest entirely different, new uses for the material, such as rigid piping, coatings, and foam.

"High-Impact Plastics as Engineering Materials," by F. L. Ingley and P. J. Meeks, Dow Chemical Co., was next.

The mechanical properties of the more widely used high-impact plastics were reviewed and related to engineering requirements of fabricated parts. The effect of fabrication methods—injection molding, extrusion, and vacuum forming—on these properties was discussed.

The importance of choice of plastic raw material and the design of the finished part were stressed, with particular emphasis placed on polystyrene-based plastics and polyethylene.

"'Zytel' Nylon Resin, a Versatile Engineering Material," by W. C. Warriner and A. J. Cheney, E. I. du Pont de Nemours & Co., Inc., Polychemicals department, was the final paper on the plastics session program.

All designers utilizing engineering materials are qualified to produce designs in "Zytel" nylon resin, it was said. The designer, using this resin or any other material, must have the necessary design data and understand how these data can be applied in practical applications.

This paper outlined the availability of design data, the outstanding and unusual properties of "Zytel," and how they can be applied by the practical designer.

Rubber Session

Chairman for the rubber session was W. K. Taft, Synthetic Rubber Government Evaluation Laboratory, and vice chairman was G. L. Bruggemeier, Firestone Tire & Rubber Co.

"The Properties and Applications of Silicone Rubber," by Silas A. Braley, Jr., Dow Corning Corp., was the first paper on the rubber session program.

Although its mechanical properties are markedly inferior at ordinary temperatures, silicone rubber is shown to be superior to organic rubber when the rubbers are subjected to temperatures above 250° F. The properties of silicone rubber were considered and compared to those of organic rubber, particularly at high and low temperatures.

The physiological inertness, dielectric properties, and resistance to various chemicals and oils were also discussed, as well as uses resulting from these properties.

"Properties and Applications of Coral Rubber—*Cis* 1,4 Polyisoprene," by Glen Alliger, James M. Willis, Ward A. Smith, and J. J. Allen, of Firestone, was the next paper on the program.

It has been demonstrated that low hysteresis and retention of tensile properties at elevated temperature are necessary properties of body compounds designed for use in heavy-duty truck and bus tires. *Hevea* rubber has these two properties, but no synthetic polymer, otherwise suitable for use in tires, previously met these requirements.

Coral rubber, a *cis* 1,4 polyisoprene (made by lithium polymerization of isoprene), however, has the essential quality of natural rubber. In particular, Coral rubber matches natural rubber with respect to the two properties mentioned above.

Tire tests of Coral rubber have confirmed the fact that this new polymer is similar to *Hevea* and a potentially satisfactory replacement for *Hevea* in bodies and treads of heavy-duty truck tires.

The properties of Coral rubber also indicate that it could be successfully used in certain mechanical goods applications (e. g. motor mountings).

"Polyurethane Rubber as a Material of Construction for Rubber Products," by G. H. Gates and W. M. Larson, Goodyear Tire & Rubber Co., was the final paper on the program.

Polyurethane rubbers have possibilities for use in engineering applications where high tensile strength, excellent abrasion, oxygen resistance and good hysteresis properties are required. These properties of urethane rubber equal or surpass those of natural rubber, even in gum stocks. In addition, the diisocyanate chain-extension process makes this material adaptable to special techniques, such as direct casting and foaming.

Summary

Dr. Morton said in conclusion that it was interesting to note that this program was greatly concerned with new polymers. Of the seven papers, three dealt with polymers which had been developed during the past two or three years.

The new and exciting possibilities of synthesizing highly regular and specific polymer structures, e.g., crystalline polyethylene and *cis* polyisoprene, were especially noteworthy. Furthermore, the versatility of the new polyurethane rubbers was also very striking.

The engineer today apparently must keep abreast of all these new chemical developments, which offer a continually increasing number of materials of construction. The entire field of synthetic rubbers and plastics is not even two decades old in this country; yet the rate of development has been little more than spectacular. This situation offers a real challenge to the ingenuity of the design engineer.

Amester Polyester Resins

American Alkyd Industries, Carlstadt, N. J., is now producing a complete line of polyester resins for rigid and flexible foams based on polyester-isocyanates formulations. The line includes general-purpose Amester 722, light stabilized Amester 722 L.S., reactive Amester 502, matched metal die resin Amester 552, low-viscosity Amester 722 L.V., thixotropic Amester 822, fire-retardent Amester 852, flexible Amester 922, gel coat Amester 1022, and polyester resins for rigid and flexible foams.

National Plastics Exposition Sets New Records

New records in attendance and exhibit space were set at the Seventh National Plastics Exposition, sponsored by the Society of the Plastics Industry, Inc., and held at the New York Coliseum, New York, N. Y., on June 11-15. Nearly 30,000 individuals from all branches of business, industry, and government visited the show. This attendance far exceeded the expected turnout of 20,000 and was more than double that of the last Exposition, held in Cleveland, O., in 1954. Attendance at that show totaled 14,171 industry visitors. As in the past, the Exposition was not open to the general public.

More than 330 exhibits prepared by 235 companies occupied two floors of the Coliseum, covering some 70,000 square feet of exhibit space. This is an increase of almost 25% over that of the 1954 show and almost 120% more than the space occupied in 1948 at the Grand Central Palace, the last time the show was in New York. The City did its part by designating the week of the Exposition as "Plastics Week," and Columbus Circle (site of the Coliseum) was officially renamed "Plastics Circle" during that week.

Exhibitors expressed great satisfaction with this year's show which covered all branches of the plastics industry, including molders, fabricators, material suppliers, mold makers, machinery suppliers, instrument manufacturers, laboratories, service organizations, and others. Exhibitors were particularly pleased with the attendance, which represented all types of occupations and industries, and the large volume of business expected to result from inquiries and tentative orders received from the visitors.

Great Future for Plastics Seen

At the official opening of the Exposition on June 11, Norman Anderson, General Molded Products Co. and 1956 president of SPI, predicted that gross sales for the plastics industry this year will exceed $2 billion; while plastics production should reach a total of four billion pounds this year, making 1956 a record year for the industry. This growth picture holds true for both thermoplastic and thermosetting materials.

Mr. Anderson predicted that polyester resin production for reinforced plastics would increase 50% over the 49-million-pound total of 1955. Vinyl resin output this year is expected to surpass the 1955 level; while polyethylene production this year promises to be 50% higher than last year's total of 420,191,117 pounds. All other plastic materials continue to show marked evidence of growth, Mr. Anderson noted.

Exhibit Highlights

Any review of the Exposition exhibits cannot do more than touch on some of the highlights, since almost each of the 330 exhibits featured one or more new items, whether raw materials, molding materials, products, equipment, instruments, etc.

American Cyanamid Co. featured new decorative effects in melamine dinnerware; two new thermoplastic molding compounds; and a do-it-yourself method of building a patio roof with glass-reinforced polyester corrugated panels. Bakelite Co. displayed a new bulk-handling system for molding resins; encapsulating resins; low-pressure molding of reinforced plastics; new light-colored paints for phenolics; and demonstrations of skin-packaging, plastic tool making, molten bead sealing, and phenolic foam blowing.

Carbide & Carbon Chemicals Co. exhibited its plasticizers, monomers, and intermediates, including a new monomer for making rigid or semi-rigid vinyl products by the plastisol technique. Highlights of the Celanese Corp. of America exhibit of its molding materials were its new polyolefin thermoplastic material and a one-piece molded body for a refrigerated truck made by Heil Co. of reinforced Celanese polyester resin.

New items shown by Dow Chemical Co. included four modified polystyrene formulations, an improved saran monofilament resin, an expected new family of styrene-acrylonitrile thermoplastics, and a new ethyl cellulose compound. The exhibit by E. I. du Pont de Nemours & Co., Inc., featured a closed-circuit television program, "Customers' Showcase," where 38 makers of products using the company's resins were interviewed, and the products displayed. Incidentally, this program drew much sympathy from visitors for the people forced to undergo the hot, bright lights needed for television.

Two new formulations highlighted General Electric Co.'s exhibit of its phenolic molding compounds. Nearly 100 practical applications of vinyl plastics were shown by B. F. Goodrich Chemical Co. in its "House of Today," a full-scale cutaway showing living room, kitchen, utility room, patio, and section of the "house next door." A scale-model of the "House of Tomorrow" was featured in the Monsanto Chemical Co. exhibit; this house will demonstrate and test the uses of plastics in home construction, and the first house will be built early next year in the Tomorrowland area of Disneyland.

Entrance to National Plastics Exposition at New York Coliseum had molded Tenite butyrate letters over marquee

The displays by equipment manufacturers received particular attention at the Exposition, since most of the firms had at least one machine in actual operation and were distributing as samples the items being produced. To be noted among the equipment displays were a new cavity steel for plastic molds and cast dies, by Detroit Mold Engineering Co.; the precision extruders of National Rubber Machinery Co.; the high-output extruders, complete with fully automatic temperature control cabinet, shown by Prodex Corp.; the new two-ounce automatic injection machine by F. J. Stokes Corp.; and the automatic process control units, employing beta-ray gages, of Tracerlab, Inc.

Of the exhibits, 53 were by companies in the processing field, including such operations as molding, extrusion, calendering, casting, decorating, finishing, assembly, etc. These displays provided much of the color at the Exposition, and the products shown ranged from novelties, toys, and housewares to industrial items and components. In this group of exhibitors, special mention must be made of the new Anchorene modified-styrene tracks extruded by Anchor Plastics Co.; the new Star utility car of reinforced plastic shown by Bassons Industries Corp.; and the display by Chicago Molded Products Corp. which featured extruded linear polyethylene sheet, a new laminated plastic construction panel, and extruded styrene copolymer sheet.

SPI Vinyl Dispersions Unit

The SPI recently organized a vinyl dispersions division "to bring about stable, well-integrated growth in the vinyl dispersions industry," according to William T. Cruse, executive vice president of the SPI.

The new division will also develop specifications, physical test procedures, and performance standards on vinyl dispersions for eventual adoption by the industry. The collection and dissemination of statistics on vinyl dispersions will be another function of the division.

Canadian Polymer Forum

The Seventh Canadian High Polymer Forum will be held at the Guildwood Inn, Sarnia, Ont., Canada, November 8 and 9. The event is cosponsored by the National Research Council of Canada and the Chemical Institute of Canada and is devoted to all aspects of polymer science.

Authors of papers are asked to notify the program chairman, D. G. Ivey, Department of Physics, University of Toronto, Toronto 5, Ont., giving title and authors. Abstracts and final titles will be required by August 31.

Room reservations should be submitted to Guildwood Inn, P. O. Box 912, Point Edward, Ont.

Travel and other information may be obtained from the chairman of the Seventh Canadian High Polymer Forum, H. L. Williams, Polymer Corp., Ltd., Sarnia.

Ervin Tells of New Trends in the Industry at Chicago

"The Rubber Industry's New Look" was the subject of a talk given by L. R. Ervin, The General Tire & Rubber Co., to 170 members of the Chicago Rubber Group at the Furniture Club, Chicago, Ill., April 27.

An important aspect of the rubber industry's "new look" is that the sales value of non-tire rubber goods now exceeds that of tires and related materials, and the gap between the two is widening, Mr. Ervin said. In 1939 non-tire rubber product sales stood at $355,819,000, compared to $522,876,000 worth of tires and repair materials. In 1953 the figures were $1,956,770,000 and $1,901,312,000, respectively.

Mr. Ervin predicted that by 1956 non-tire production will be doing two-thirds of the available rubber business, thereby reversing the prewar position when tires amounted to two-thirds of the rubber industry business.

Another change in the picture is the increasing trend to synthetic rubber. The high cost of natural rubber during 1955 penalized the American rubber manufacturers and customers at least $152 million, a figure based on natural rubber's cost beyond a 35¢-a-pound average.

This penalty will not accrue again, the General Tire executive declared. By 1960 the overall capacity of American synthetic rubber plants will be increased to 1,500,000 long tons, or 53% of the estimated world consumption in that year, and 94% of the requirements of the United States.

Consumption of natural rubber, however, will not stop. The United States will need about 590,000 tons of it during 1960, or 40% of the total rubber consumed. Mr. Ervin said that natural rubber can be delivered in New York from the Far East for 15¢ a pound, allowing an adequate profit to the rubber plantations.

Citing diversification as another trend in the rubber industry, Mr. Ervin said that General, once a tire and tube producer, now makes a wide variety of rubber goods, plastics, chemicals, and rockets, in addition to tires and tubes.

The company, together with El Paso Natural Gas Co., will also begin production of synthetic rubber at Odessa, Tex., when the plant being constructed there, "the first fully integrated synthetic rubber plant to be built in this country by private capital since World War II," is completed.

During the business session of the meeting, 24 graduates of the Chicago Rubber Group's recently ended rubber technology course, all associated with industrial firms in the Chicago area, were presented with their diplomas.

Also, the newly elected officers of the organization were announced. They are A. E. Laurence, Phillips Chemical Co., president; V. J. Labrecque, Victor Mfg. & Gasket Co., vice president; M. J. O'Connor, O'Connor & Co., secretary; and John Groot, Dryden Rubber Division, treasurer.

R. F. Anschuetz, Witco Chemical Co., and R. A. Kurtz, E. I. du Pont de Nemours & Co., Inc., were elected directors representing suppliers. J. F. Swart, Johns-Manville, and J. T. Doyle, Bauer & Black, were elected directors representing manufacturers.

NSF Gives $76,500 for USSR Journals Translation

The National Science Foundation, Washington, D. C., has awarded a grant of $76,500 to the American Institute of Physics as part of an expanding program for the translation into English of Russian literature, according to Alan T. Waterman, director of the Foundation.

The Russian publications to be translated include the *Zhurnal Teknicheskoi Fiziki* (*Journal of Technical Physics*), *Akusticheskii Zhurnal* (*Acoustics Journal*), and physics articles from the *Doklady Akademii Nauk SSSR* (*Proceedings of the USSR Academy of Sciences*). The first issues of the translated journals will appear this summer.

The Foundation and the Institute have already collaborated in the publication of *Soviet Physics—JETP*, a bi-monthly translation of *Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki* (*Journal of Experimental and Theoretical Physics*), six issues of which have so far appeared.

In making the announcement, Dr. Waterman described the new project as part of his agency's program, now in its fourth year, to increase the availability in the United States of the published results of foreign scientific research. The Foundation is also supporting translations of Russian papers in mathematics and biology.

Subscription prices for the translated journals are as follows: *Journal of Technical Physics*, about 4,000 pages a year, $90; *Acoustics Journal*, about 500 pages a year, $20; *Proceedings of the USSR Academy of Science*, (physics articles only), about 900 pages a year, $25.

W. R. Smith, Godfrey L. Cabot, Inc., addressing Thiokol Technical Club meeting

CIC Rubber Division Meet

Eight technical papers were presented at the May 30 meeting of the Rubber Division of the Chemical Institute of Canada during the Institute's thirty-ninth annual conference and exhibition at the Sheraton-Mt. Royal Hotel, Montreal, P. Q., Canada, May 28-30. Abstracts of these papers were published in the May issue of RUBBER WORLD.

The meeting was presided over by G. J. Baxter, Firestone Tire & Rubber Co. of Canada, Ltd., outgoing chairman of the Rubber Division. A good number of chemists, chemical engineers, and others was in attendance.

At the annual business meeting of the Division the following slate of officers was elected: chairman, R. O. Huggenberger, Dominion Rubber Co., Ltd.; vice chairman, H. K. Cunliffe, Dunlop Canada, Ltd.; secretary-treasurer, J. A. Carr, Dunlop; honorary chairman of the executive committee, Gordon J. Baxter, Firestone Tire & Rubber Co. of Canada, Ltd.; and executive committee members, W. H. Bechtel, Kaufman Rubber Co., Ltd.; L. F. Huhta, Goodyear Tire & Rubber Co. of Canada, Ltd., and E. J. Gibbon, Canadian Industries, Ltd.

Ozone Conference Slated

An International Ozone Conference, the first conducted in the United States, will be held at the Sheraton Hotel, Chicago, Ill., November 28-30, according to the Armour Research Foundation of Illinois Institute of Technology, one of the conclave's sponsors. About 50 papers on applied and fundamental chemistry of ozone will be presented, some by foreign scientists.

Also sponsoring the conference are Aerojet-General Corp., Air Reduction Co., American Electroaire Co., E. I. du Pont de Nemours & Co., Inc., Grace Chemical Research & Development Co., Groak Engineering Corp., Westinghouse Electric Corp., and the Division of Industrial and Engineering Chemistry of the American Chemical Society.

Further information on the conference may be obtained from Sidney Mittler, Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

Cabot's Smith at Thiokol

Walter R. Smith, associate director of research for Godfrey L. Cabot, Inc., spoke on "Basic Aspects of Reinforcement" before 200 guests of Thiokol Chemical Corp., Trenton, N. J., at a dinner-meeting of its Technical Club, June 4.

Dr. Smith, discussing the use of carbon black as a rubber-reinforcing agent, took the view that the reinforcement was a physical rather than a chemical phenomenon. Research has shown that the smaller the pigment particle, and the more spherical, the greater the amount of reinforcement achieved, he said.

Rubber Groups Hold Annual Outings

Record Crowd for New York

The New York Rubber Group held its annual outing at Doerr's Grove, Millburn, N. J., on June 7, with more than 200 members and guests putting in an appearance to make this year's attendance the highest in the history of the organization.

Sports events, organized by the outing chairman, Henry Peters, Bell Telephone Laboratories, occupied the greater part of the afternoon, with thirsty participants keeping the refreshment stands in full-time operation. Dinner was served at 5:30 p.m., after which prizes were awarded.

Competition winners included Stan Rutkowskie, Sindar Corp., captain of the winning soft-ball team; W. F. Lamella, Okonite, and N. L. Hewitt, LaFavorite, first and second prizes, respectively, in the horseshoe event; L. S. Minckler and W. J. G. McCulloch, both of Esso, took the top boccie award; while P. T. Tufts and B. Carney, both of Barrett Division, took the second prize in this event; George Sheppard, General Electric, basketball throw; A. Schimpf, Manhattan Rubber, baseball throw; O. J. Zeiler, Titanium Pigment, and B. Carney, Barrett, first and second prizes, respectively, in the golf contest; while M. R. Buffington, Lee Fabrics, and L. S. Minckler, Esso, tied at a high score of 390 at the dart board.

Prizes were distributed by M. E. Lerner, of *Rubber Age* and secretary-treasurer of the New York Group.

Mr. Lerner also announced that the annual golf tournament will be held August 2, at the Innis Arden Golf Club, Old Greenwich, Conn.

Rhode Island Club Golfs

The seventeenth annual outing and golf tournament of the Rhode Island Rubber Club was held at the Pawtucket Country Club, Pawtucket, R. I., June 7, with 288 members and guests in attendance. Lowest score in the golf tourney was achieved by J. A. Loring, Roger Reed Co., followed by L. Yates, Atlantic Paper & Twine Co., and D. Cassell, Acushnet Process Co.

Blind bogey winners were K. Barrett, Naugatuck Chemical Division; H. P. Donahue, Godfrey L. Cabot, Inc.; and C. K. Mullin, C. K. Mullin Co. Nearest to the pin on the fifth, seventh, and fifteenth holes, respectively, were Tom Joy, Gulf Oil Co.; J. E. MacDonald, H. Muehlstein & Co., Inc.; and J. L. Jacinto, Collyer Insulated Wire Co.

Most 6's, 7's, and 8's were made respectively, by J. Mazza, United States Rubber Co.; J. Cullen, Marbon Corp.; and J. Poulton, Collyer. Conrad Lyons, Rubber Corp. of America, recorded the longest drive. Winners of the putting contest were W. Maguire, United Carbon Co.; C. L. Kingsford, U. S. Rubber; and J. Roy, American Sisal Kraft, in that order.

An honorary golf prize was awarded Charles Haynes, National Polychemicals, Inc., while a not-so-honorary prize was given S. S. Penza, U. S. Rubber, for the highest gross score.

More than 120 companies in the Rhode Island area contributed door prizes for the outing.

Golf for Fort Wayne Group

The Fort Wayne Rubber & Plastics Group held its fifth annual golf outing at the Tippecanoe Lake Country Club, Leesburgh, Ind., June 8, with 247 members and guests participating in golf and other activities and attending the evening dinner.

Glenn Stover, Central Rubber & Steel Co., won the Goshen Rubber Trophy and another trophy for his low gross score of 73. Under the Peoria system, Lew O'Dell, a guest, was awarded a trophy for his low score of 60. Other winners included R. A. Kurtz, E. I. du Pont de Nemours & Co., Inc., longest drive; Stan Meyer, United States Rubber Co., second longest drive; W. L. Jones, a guest, closest to the pin; and Maury Jones, Marbon Corp., second closest to the pin. John Drompp, The General Tire & Rubber Co., was high net for the day.

Prizes were contributed by 114 rubber and supplier companies.

The Group's outing committee consisted of John Lawless, Du Pont; Ken Tewell, General Tire; Walter Wilson, R. T. Vanderbilt Co.; Tom Saputo, Latex Compounders, Inc.; Bob Rulison, Baker Castor Oil Co.; Bob Hartman, Monsanto Chemical Co.; Al Robinson, Harwick Standard Chemical Co.; John Porter, H. Muehlstein & Co., Inc.; Bob Blair, Mogul Rubber Co.; and Dick Wettschurack, Brown Rubber Co., Inc.

The Group's newly elected officers were announced as follows: chairman, Maurice J. O'Connor, O'Connor & Co.; vice chairman, George E. Kelsheimer, U. S. Rubber; and secretary-treasurer, Phil Magner, Jr., General Tire.

The next meeting of this Group will take place September 27 at the Van Orman Hotel, Fort Wayne, Ind.

Boston Frolic

The Boston Rubber Group held its twentieth annual summer outing and golf match at the Country Club, Andover, Mass., June 15, with 615 members and guests present, a new attendance record for the event. J. Simpson, Hodgman Rubber Co., and K. Barrett, United States Rubber Co., took low gross and low net honors, respectively, in the 18-hole golf competition.

Following in the 18-hole low gross tabulation were M. J. Wilner, Plymouth Rubber Co.; R. A. Nelson and R. Steer, Hood Rubber Co.; and W. A. Maguire, United Carbon Co. Other low net winners were J. F. Lamond, Bolta Products Corp.; J. W. Baldwin, Industrial Solvents & Chemicals Corp.; F. Comery, Premoid Corp.; John Hussey, The Goodyear Tire & Rubber Co.; and D. Aldrich, D. S. Kennedy Co., in that order.

In the nine-hole tourney, low gross winner was R. Bettano, Synthon & Co., followed by W. B. Sinclair, Celanese Corp. of America. Lowest net was achieved by W. M. Peterson, Boston Woven Hose & Rubber Co.; second lowest was scored by R. Fosberg, Wyandotte Chemical Co.

Other golf winners included N. Tuthill, Pequanoc Rubber Co., and V. Nutile, General Latex Corp., nearest to pin; J. H. Hand, Monsanto Chemical Co., most sixes; Norman Mullin, C. K. Mullin Co., most sevens; F. Nadherny, Godfrey L. Cabot Co., G. Hill, Mullin Co., and L. Longworth, Monsanto, 18-hole kickers' handicap; Donald J. Voss, Westvaco Chlor-Alkali Co., J. Martin, B. F. Goodrich Co., and Laurance Lord, Columbia-Southern Chemical Co., nine-hole kickers' handicap.

Also H. Logan Lawrence, E. I. du Pont de Nemours & Co., Inc., E. Dingwell, Raffi & Swanson, Inc., and Albin S. Krivitsky, Boston Woven Hose, putting contest. A MacDonald, du Pont, and H. P. Donahue, Cabot, were high gross and high net, respectively, for the day.

Winners in other sports included Arthur Peros, Goodrich, tub and ball game; Robert Gerade, Goodall-Sanford Co., darts; and Robert Killam and Joseph Collel, Avon Sole Co., horseshoes. The baseball game was won by the Godfrey L. Cabot nine, reinforced by players from other companies, with C. Wilson, Sun Oil, umpire.

William H. King, Acushnet Process Co., headed an outing committee consisting of James J. Breen, Barrett & Breen Co., and Harry Atwater, Malrex Chemical Co. Door prizes from 229 firms were distributed.

Buffalo Group on Fairway

The annual outing of the Buffalo Rubber Group was held at Lancaster Country Club, Lancaster, N. Y., June 19, with 101 members in attendance. W. H. Pender, Magnesite Co., and F. Kohlhagen, Globe Woven Belting Co., Inc., scored low gross and low net, respectively, in the day's golfing activities. Mr. Pender also achieved the second lowest net.

Third, fourth, fifth, and sixth lowest net score were made by Jack Wilson, Dow Corning Corp.; E. Helmbrecht, Hewitt-Robins, Inc.; N. Johnson, Socony Vacuum; and Bob Hoffman, National Aniline Division, in that order. Charlie Johnson, Hewitt, won the hole-in-one tournament, followed by Joe Beecher, Globe Woven.

Bud Behney, Harwick Standard Chemical Co., proved the owner of the most accurate baseball throwing arm, with Bob Kirwin, Globe Woven, his chief competitor. Jack Shepard, Hewitt, walked away with the balloon blowing honors; while the water-filled balloon throwing tourney was won by John Helwic, Dunlop Tire & Rubber Co., with Calvin Schmidt, Dunlop, second.

The committee in charge of arrangements included Charles Wahl, Hewitt; Charles Miserentino, Dunlop; John Helwic; Larry Halpin, Dunlop; Dick Herdlein, Hewitt; and Dan Gubala, Pierce & Stevens.

Discuss Scientist Shortage

The Thomas Alva Edison Foundation played host to the National Committee for the Development of Scientists & Engineers at West Orange, N. J., June 21, in a meeting designed to stress the need of more scientific and technical personnel.

Speakers included Charles Edison, honorary president of the Thomas Alva Edison Foundation; Howard L. Bevis, chairman of the National Committee and president of Ohio State University; Charles F. Kettering, former vice president of General

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NEWS of the MONTH

Washington Report and National News Summary

. . . With the rejection of the proposed sale to Union Carbide & Carbon Co. of the alcohol butadiene plant at Louisville, Ky., Congress extended the life of the Rubber Producing Facilities Disposal Commission until July 1, 1957. The Commission will propose new legislation for sale of this facility to the next session of Congress, and it will carry no requirement that the plant must produce butadiene. The General Services Administration will be authorized to dispose of the Akron Government Laboratory after June 30.

. . . A survey by the Rubber Manufacturers Association has indicated that there is a demand for about 95,000 long tons a year for technically classified rubber in the United States, if efficient distribution and proper prices equal to corresponding grades not technically classified are maintained.

. . . Congress reversed itself and abandoned the extra excise tax proposed on tubeless tires and probably will take no action on the plan to tax tires at the manufacturer's plants in all cases.

. . . Six of the country's largest rubber companies who manufacture V-belts were indicted by the Justice Department for alleged price fixing in the sale and distribution of this product. Two companies have issued denials.

. . . Tariff cuts on synthetic rubber, tires, and certain plastics have been announced by the State Department in exchange for import reductions by several countries abroad on rubber products and synthetic rubber.

. . . Harvey S. Firestone, Jr., reported business conditions in Western Europe better than at any time since the end of World War II, on his return from a European trip.

. . . Wage talks have begun between the Big Four and several other rubber companies and the United Rubber Workers of America, AFL-CIO, aimed at a "substantial" increase this year.

Washington Report

Disposal Commission Revived Until July 1, 1957; New Legislation on Louisville Plant Required

"The Rubber Producing Facilities Disposal Commission has died three times, but seems to lack a decent burial."

With these words last month, Holman Pettibone, RPFDC chairman, heaved a sigh of resignation, accepted a Congressional plea to go back to work. The Commission had sent its report to Congress covering sale of the Louisville alcohol butadiene plant to Union Carbide & Carbon Co. for $3,125,000. For the third time in less than a year, this was to be the Commission's last task—it was to go out of business, at last, this summer.

Six hours after Mr. Pettibone's personal appeal for Congressional approval of the Union Carbide sale, however, he agreed to reconvene his colleagues and staff to resell Louisville at a hoped-for higher return to the government. The House Armed Services, led by iron-handed, persuasive Carl Vinson, Georgia Democrat, overwhelmingly rejected the Carbide transaction, then decided to revive the Commission until July 1, 1957.

New 1957 Legislation Required

When the Louisville plant goes on sale next year, however, it will carry no requirement that it must produce butadiene. Furthermore, it may not be subject to the national defense, standby provision found in the contracts covering virtually all previous sales of government-owned synthetic rubber plants. The Disposal Commission was given a free hand to suggest legislation which will bring the highest price to the government—and on the House side, at least, sentiment is strong for an outright sale, sans any limitations.

Behind the sentiment was the strong flavor of feeling within the Armed Services Committee that the plant will have little, if any, importance to the national defense stature in the event of an emergency. With expansion booming in the petroleum butadiene field and alcohol butadiene becoming increasingly difficult to produce economically, the Committee has taken the view that a purchaser should be free to produce chemicals of his choice—one probably just as strategic as alcohol butadiene.

With advice from the Defense and Interior departments, plus the Office of Defense Mobilization and staff-level people on Capitol Hill, the Disposal Commission will present a new Louisville plan to Congress early next year. No deadline was set for submission of new legislation, but it should be ready soon after the 85th Congress assembles for its first session in January.

House Rejects Carbide Sale

Key factors in the top-heavy House Armed Services Committee vote against sale to Union Carbide were (1) Attorney General Herbert Brownell's warning that

it "would not best foster the development of a free competitive synthetic rubber industry"—a warning underscored heavily by Publicker Industries in its fight against the sales contract—and (2) the opinion of Comptroller General Joseph Campbell that the title to Louisville would have been clouded by less-than-full clearance from the Attorney General.

Mr. Campbell told Congress that the Disposal Act required "an affirmative approval" by Mr. Brownell and concluded: "We believe that any title which Union Carbide & Carbon Corp. may receive to the Louisville plant . . . would not be free from question."

Publicker, lessee of the Louisville facility until April 4, 1958, put up a determined fight against the deal after the Commission had refused to consider the firm's offer to meet Union Carbide's offer. Before the Commission announced the sale, Publicker had been willing to go only as high as $2.4 million. While the Carbide offer has been rejected, the Commission is still free to extend Publicker's lease, or rent to another firm, on a long-term basis—a minimum of five and a maximum of 15 years. That this alternative has dim possibilities was noted by the Armed Services group in its report against sale at this time.

"From the testimony of the Disposal Commission it appears highly unlikely that the Commission would be able to extend the lease or enter into a new lease which would give the government a financial return commensurate with the Commission's estimate of fair value. [This discussion was based on Mr. Pettibone's report that the government was collecting about $144,000 yearly from Publicker, but spending more than $190,000 to maintain two production lines not in service.] Thus it is highly unlikely that a new lease will be entered into.

"Furthermore, the Disposal Commission has indicated that if different criteria were established for the sale of this facility, a higher return to the government might be obtained. Because of the many factors surrounding the proposed sale, as well as the obvious inability of alcohol butadiene to compete with petroleum butadiene in a normal market, and since the production of petroleum butadiene will increase to a considerable extent in the next few years, it appears highly unlikely that a sale could be consummated where the purchaser could actually commit himself to the continuing manufacture of a component material of synthetic rubber in a normal competitive market."

1956 Akron Lab Sale?

With these words, the Committee ordered another round of bids to rid the government of its last synthetic rubber plant. Meanwhile, Capitol observers were predicting that disposal plans in another area of the synthetic rubber field would slide through Congress in the closing days of the session without controversy. In short, the prediction was this: Congress will authorize the General Services Administration to dispose of the laboratory facilities at Akron some time after the existing contract with Akron University expires June 30. Akron U has taken itself out of the bidding after a long tenure as the only operator of these government owned labs.

RMA Survey Finds T. C. Rubber Demand at 95,000 Tons; Market Restricted by Distribution and Price Problems

Chief conclusion drawn by The Rubber Manufacturers Association, Inc., from its survey on United States requirements for technically classified natural rubber was that there is little interest in the material under the existing conditions of production and sale. A sizable market for T. C. rubber, the survey showed, would blossom in this country only under these conditions: (1) its distribution can be efficiently organized so consumers can easily arrange regular and dependable sources of supply; and (2) it may be purchased at prices no higher than those quoted for corresponding grades which are not technically classified.

An RMA official explained the relatively half-hearted demand for T. C. rubber among American consumers this way: "You can't get the stuff when you want it, and those who do want it have to pay a premium because their sellers have to locate it for them."

This attitude contrasts sharply with the plans and hopes of French producers, who have been the prime movers in getting T. C. rubber on the market. Their efforts date back to 1950 when T. C. rubber was introduced by French producers in Indo-China.

IRSG Sponsoring Survey

After a five-year trial period the French succeeded in persuading the International Rubber Study Group—meeting in Monrovia, Liberia, last October—to sponsor a world-wide, country-by-country study of the potential demand. They wanted these questions answered: Is there sufficient demand to warrant its continued production? At what level? What are the requirements for this material in the various types and grades?

T. C. rubber is merely natural rubber that has been pretested, classified, and marked before it enters commerce. The appeal is clearly strongest to smaller rubber goods manufacturers who do not have extensive laboratory facilities to handle this function and who do not blend their rubber as is the custom for large manufacturers. T. C. rubber can be used in production with a minimum of pretesting to determine cure rate and other characteristics.

RMA Comments

"The producers claim," RMA told the firms to whom it sent questionnaires, "that this pretesting and classification provide an element of convenience, inasmuch as the rubber goods manufacturer might be spared the trouble of testing the rubber in the factory, and that once a manufacturer decided which of the classifications best suits his purpose, he can indicate this to his supplier . . .

"The consumer can select which class of natural rubber best suits his requirements. Secondly, he is assured of the technical uniformity of the bales within that consignment, and all the rubber marked with one particular symbol can be treated in the same manner, thus enabling him to dispense with blending. Thirdly, abnormal rubbers (such as skim and very slow vulcanizing rubbers) are automatically excluded from the T. C. scheme. Fourthly, he is assured of purchasing rubber from producers who are trying to satisfy his personal requirements and maintaining the standards of their product."

The initial five-year period of marketing was marked by considerable difficulty, with annual production rate climbing only as high as 60,000 long tons (current rate). Manufacturers had trouble finding regular sources of supply; while those with no interest in T. C. rubber were getting deliveries without advance notice.

Survey Details

RMA stepped forward to feel the American pulse on T. C. rubber early in March, when it mailed a questionnaire to 375 of the principal rubber consuming companies here. The poll-takers got less than an 18% response, only 67 companies responding. Of these, 21 reported no interest. However, every major product segment of the industry was included among the respondents, including all of the five largest companies.

The total demand for all types and grades of T. C. rubber added up to about 95,000 tons, including 87,473 tons medium cure, 7,694 fast cure, and 415 slow cure. (see accompanying table).

RMA Survey Results—Tabulation of Stated Requirements of Technically Classified Natural Rubber

	Long Tons Per Year			
Type and Grade	Red Circle Slow Cure	Yellow Circle Medium Cure	Blue Circle Fast Cure	Total by Grade
RSS 1	55	9,912	6,727	16,694
2	—	1,980	720	2,700
3	—	7,255	—	7,255
4	—	27,200	—	27,200
5	—	5,000	—	5,000
Thin Brown Crepe	—	5,325	—	5,325
Thick Blanket Crepe	—	29,205	—	29,205
Other				
Estate Brown	360	12	65	437
Pale Crepe		1,384	182	1,566
Air Dried Sheets	—	200	—	200
Total All Grades	415	87,473	7,694	95,582

These figures, of course, were contingent upon dependable sources of supply and parity of price with non-T. C. rubbers (several of those polled emphasized that these conditions must be met; while two of the larger companies said they would use huge quantities if available at price parity).

The potential annual requirement of 95,000 tons of T. C. rubber is equivalent to 17.5% of the total dry natural rubber imported last year. A tabulation of the ratio of potential T. C. rubber requirements to 1954 imports by type and grade (1955 data by type and grade were not available) showed these results: #1 RSS, 13.5%; #2 RSS, 7.2%; #3 RSS, 12%; #4 RSS, 58.8%; and #5 RSS, 32.3%—thin brown crepe, 17.5%; thick blanket

crepe, 68.1%; estate brown, 3.7%; and pale crepe, 9.9%.

Paradoxically, the RMA survey found the greatest potential demand in the lower grades—the area where production to date has been insignificant and where the application of the scheme has met with the unhappiest results. As for the companies indicating a need (45), more than half (25) employ less than 500 workers; of those expressing no interest (21), more than ¾ (18) fell within this category.

Separating the respondents in terms of their principal product, RMA came up with this picture on the 45 replying affirmatively: tires and tubes, 9; heavy mechanicals, 3; footwear, 3; wire and cable, 3; drug sundries, athletic goods, 7; proofed goods, 4; molded and sponge, 12; hard rubber, 2; thread, 1; unclassified, 1. The same tabulation for those indicating no interest was: tires and tubes, 1; heavy mechanicals, 1; footwear, 1; wire and cable, 1; drug sundries, athletic goods, 3; molded and sponge, 9, and heels and soles, 2.

RMA's American report has been forwarded to the International Rubber Research Committee, which will coordinate the reports of each of the participating members and will eventually issue a final report on world-wide demand.

Congress Drops Extra Excise Tax on Tubeless Tires; Collection of All Tire Taxes at Source Unlikely

The nation's tire manufacturers could breathe a little easier last month about two tax proposals which they feared would have added millions of dollars to the industry's cost of doing business. A broadside fired directly at an impending boost of a penny a pound in the excise tax on tubeless tires squelched the threat before it got off the ground. The fate of the industry-opposed change in the collection of all tire excise taxes was sealed less directly, but just as effectively.

Reversal on Tubeless Tax

Both proposals were spawned by the Forand Subcommittee of the House Ways and Means Committee midway in the current session. The Tire Division of the RMA immediately challenged them, but appeared to have "lost the day" when they were approved by the full committee. The committee, however, apparently heeding the direct appeal of RMA President Ross R. Ormsby, reconsidered the tubeless-tire levy of an additional penny and decided to reverse itself. Its terse decision read this way:

"The committee acted to reconsider its previous action with respect to recommendation 11 (f) under Section I, Manufacturers Excises. This recommendation as previously approved by the committee would impose on tubeless tires a tax rate one cent a pound higher than tires requiring separate inner tubes. The effect of the committee's action is to delete this recommendation."

Mr. Ormsby had written Committee Chairman J. Cooper, Tennessee Democrat, that the tax would have been a duplication of one imposed in the highway bill.

"It is quite obvious," he wrote, "that this recommendation was made without giving consideration to the higher tax rates imposed on tires by the new highway act, which would raise rates 60% over the present level."

Tax Collection at Source

The Ormsby plea brought speedy reconsideration by the committee and results which left the RMA happier in its long-standing support of the highway bill. As for the second Forand recommendation—collection of all tire taxes when they leave the manufacturing plant or a warehouse within 20 miles of the plant—Mr. Ormsby characterized the proposed change as doing violence "to the principle that the excise tax is imposed when the article is sold." He said it would represent a radical departure from the "basic concept of an excise tax on sale, since it proposes to assess the manufacturer for the tax long before the tire or tube is sold."

He further complained that it would interfere drastically with distribution, inventory, and production practices.

"In order to maintain a constant level of employment in tire factories, it is the practice of manufacturers to produce tires and tubes at a rate as even as possible throughout the year," he explained. "However, as sales to automobile manufacturers and tire dealers are highly seasonal, production exceeds sales in certain portions of the year, requiring the accumulation of stocks in regional warehouses located near market areas. The proposed change in the imposition of the tax would compel tire manufacturers either to tie up large amounts of cash in inventories, or to attempt to avoid this by carrying all inventories within 20 miles of their plants."

Mr. Ormsby asked the committee to reject the recommendation on the grounds it would either (1) cut back service to dealers through the reduction of field points, or (2) bring a sharp reduction of overall inventories. While the committee failed to accept the RMA arguments, the industry was claiming a victory because of the virtually overwhelming odds against Congressional action this year.

Tariff Cuts on Synthetic Rubber, Tires, Plastics; Congress Refuses OTC Approval This Year

Moderate reductions in tariffs on imported tires, synthetic rubber, and a long list of plastics and resins went into effect the first of July.

The reduced U. S. tariffs on these and hundreds of other commodities are the results of the recently concluded bargaining session of the 35-nation General Agreement on Tariffs and Trade (GATT).

In partial payment for its new concessions, the U. S. won for American exporters of rubber products and rubber-manufacturing machinery a variety of tariff concessions from the other 21 participating GATT members.

Under authority granted by Congress last year in the Trade Agreements Act, the Administration was empowered to offer duty reductions, in exchange for reciprocal concessions, of 15% of current tariffs. The 15% is spread over a three-year period, permitting annual reductions of 5% between June 30 this year and June 30, 1958.

Concessions obtained by the U. S. from other trading nations are in most cases slated to go into effect immediately.

Under the U. S. "Most-Favored Nation" principle, the advantage of its concessions are available to all nations in the free world, even though the cuts were negotiated "in favor" of a particular country.

Details of U. S. Reductions

Here is a run-down of reductions the U. S. granted:

Auto and motorcycle tires (tariff paragraph 1537 b)—from 10% of the value of imports to 8.5%. Imports in this category in 1954 were valued at $3.2 million; in 1955, $4.2 million.

Synthetic rubber (1558)—from 10 to 8.5%. Imports of synthetic have slipped from $10 million in 1950 to $9.8 million in 1954 and last year to $6.1 million.

The following list of polyvinyls (paragraphs 2-11): acetate, chloride-acetate, chloride-vinylidene chloride, butyral, formal, and alcohol—the 15% cuts effective in these categories, which make up one of the largest groups of synthetic resins produced in this country, will affect imports that in 1954 were valued at more than $8 million. Total imports in the group fell to $6.6 million last year.

Here are a few of the concessions State Department negotiators won:

The Dominican Republic cut its duty on U. S. tires and tubes, imports of which in 1954 were worth nearly $4 million, from 25 to 22%.

The Benelux customs union "bound" (a term used when a GATT party, instead of offering a duty reduction, pledges itself not to raise the tariff) its 18% duty on U. S. imports of rubberized fabrics.

Finland bound the duty-free tariff status of U. S. synthetic rubber.

West Germany, in addition to concessions on a wide range of U. S.-produced copolymers and polyvinyls, offered reductions in a range of sizes of tires and tubes.

No OTC Approval

While the State Department was detailing the tariff horse-trade, protectionist forces in Congress administered the coup-de-grâce to the ill-fated Organization for Trade Cooperation (OTC)—at least for this year. President Eisenhower, who asked approval of OTC as a bulwark of his "trade, not aid" program, was forced to bow largely to the wishes of House Republicans. The Democratic leadership refused to risk a fight on the bill in an election year.

OTC was attacked earlier in the year by spokesmen for the rubber footwear and or-

ganic chemicals industries as being an opening wedge with which foreign industries would eventually destroy competing domestic industries. Because of this country's failure to ratify the organization—designed to administer the GATT contract—foreign proponents will hold off acting on it.

Justice Indicts Six V-Belt Manufacturers

Six of the country's largest rubber companies found thmselves in hot water with the Justice Department in June over the marketing of the industrial rubber V-belts used to power transmission units in textile, railway, oil, and other machinery and in home appliances such as washing machines, refrigerators, vacuum cleaners, and pumps. Attorney General Brownell announced indictments by a Federal Grand Jury in Denver against The B. F. Goodrich Co., Gates Rubber Co., Dayton Rubber Co., Goodyear Tire & Rubber Co., United States Rubber Co., and Boston Woven Hose & Rubber Co.

The charge: violation of the Sherman Anti-Trust Act through alleged price fixing in the sale and distribution of a commodity which grossed $60 million in 1954. The Grand Jury accused the six firms of unlawful combination and conspiracy (a) to fix and establish uniform list prices, rates of discounts, terms, and other conditions for the sale of V-belts, (b) to sell V-belts at uniform list prices, less graduated and uniform rates of discount applicable to all classes of the trade, (c) to increase, from time to time, the prices of V-belts by lowering the rate of discount from list prices, and (d) to fix and determine the effective dates for price changes.

The Justice Department's comment on the indictments came from outgoing trust-buster Stanley N. Barnes, head of the anti-trust division: "The indictment alleges that the defendants have fixed and maintained uniform list prices, rates of discounts to various classes of the trade, and other terms of sale for rubber V-belts. Any price fixing conspiracy, such as alleged in this case, militates against competition in an industry.

"Such violations have long been condemned by the courts, and they warrant prosecution."

Goodrich was reported to have said early in June that it had not at that time had an opportunity to review the indictments, but "reaffirms the position taken by its witnesses before the Denver Grand Jury that it is innocent of the charges made."

Goodyear said at about the same time that it "has consistently maintained its independence of action in the intense competitive conditions encountered in the V-belt business," and "the reasonable levels of prices to consumers over the years, as well as the absence of actual price uniformity, indicate strongly that competition, not price fixing, is the rule of the industry."

Stockpile Objectives and Rotation Unchanged

Defense Mobilization Director Arthur S. Flemming reported in June on the Administration's review of the rubber stockpiling program. He said his agency found no reason to change either the stockpile objective for natural rubber or the existing system of rotating the stockpile inventory. He hinted that ODM spent quite some time reviewing the situation before deciding on the status quo.

Purchase operations for new stockpile rubber came to a halt almost three years ago when the stockpile objective (a government secret) neared attainment. Since then, purchases have been limited to amounts required to rotate the inventory and keep it at top quality.

Like all other materials in the stockpile, the agency emphasized, the rubber stockpile objective is under continuing study, and "when new military mobilization requirements for rubber products are received in the latter part of 1956 a new review will be undertaken."

Firestone Optimistic on European Business Conditions

Harvey S. Firestone Jr., chairman of the Firestone Tire & Rubber Co., on his return from Europe on June 26 after an inspection tour of his company's manufacturing and sales facilities there, said that business conditions in Western Europe are better than they have been at any time since the termination of the Second World War.

One of the most encouraging developments in Europe today is the increasing use of techniques to create new markets and to expand existing markets in the manner we in the United States have employed for some time, he added. Through research new products are being developed, and old products are being improved. Greater productivity, made possible through improved production methods and investments in new and better equipment, has resulted in raising real incomes and the standard of living.

The activity in the rubber manufacturing industry in Western Europe continues to reflect the strong growth trend characteristic of the industry throughout the world. Consumption of rubber in this area between 1950 and 1955 increased 67%, from 327,750 to 548,000 long tons, it was said. In the United States during the same period the gain was from 1,258,557 to 1,529,699 long tons, or up 21.5%.

Because of the general prosperity, registration of motor vehicles in Great Britain, France, Western Germany, and Italy rose 63%, compared with an increase of 28% in the United States during the same period.

Capacity for the production of tires in Firestone's European plants has been increased by 50% during the last two years, and all these plants are running at full capacity.

While abroad, Mr. Firestone visited plants and sales offices in England, France, Germany, Portugal, Spain, and Austria. He was present at the one hundredth anniversary celebration of the Firestone affiliate in West Germany, Phoenix Gummiwerke A.G.

Wage Talks with URWA Start

The United Rubber Workers of America, AFL-CIO, started wage talks with several rubber companies during late June and early July aimed at a "substantial" wage boost for the production workers in the industry.

The B. F. Goodrich Co. was scheduled to begin negotiations with the union on June 26 in Cincinnati, O. Negotiations with The General Tire & Rubber Co., were set for Cleveland, June 27. Similar sessions were scheduled to start on July 2 in Dayton, O., with Goodyear Tire & Rubber Co., and in New York, N. Y., with United States Rubber Co. The Firestone Tire & Rubber Co., on July 3, began negotiations with the union in Columbus, O., and Seiberling Rubber Co., in Akron, July 10.

These negotiations will be concerned with wages only, unless individual companies agree to discuss working conditions. Late last summer, the URWA won a 12¢ hourly straight wage increase for its membership, plus other benefits that added up to a total package estimated at 16¢ an hour. The union may have to settle for less this year, it has been suggested, owing to a slowdown in the industry's operations as a result of lower auto output. Industry and union sources have both expressed the opinion that the negotiations would settle the wage issue without any major strikes. Present contracts expire with Goodrich on July 14 and with the Firestone, Goodyear, and U. S. Rubber on July 21.

Thiokol Will Market Butyl

Thiokol Chemical Corp., Trenton, N. J., will market butyl rubber in collaboration with Petroleum Chemicals, Inc., a company owned jointly by Cities Service Co. and Continental Oil Co. Petroleum Chemicals operates a butadiene plant at Lake Charles.

Thiokol will establish a sales, research, and development laboratory at its Trenton works to study and develop wider uses for butyl rubber, the firm says. It will assist consumers in the choice and utilization of butyl rubber.

Jersey Zinc Strike Ends

The 52-day strikes at the Palmerton, Pa., and Depue, Ill., plants of New Jersey Zinc Co., New York, N. Y., have been settled on the basis of a general wage increase of 10¢ an hour, the company reveals. The settlement also included improvement in job class differentials, paid holidays, and increase of sickness and accident benefits.

Industry News

Goodyear Puts Dual-Chamber Safety Tire on Market

A passenger-car safety tire with two separately inflated chambers has been developed by The Goodyear Tire & Rubber Co., Akron, O. The inner chamber of the new tire can bear the full weight of the vehicle when the outer tread has been punctured, and the car can proceed safely, it is claimed, at normal speeds for as much as 260 miles.

Called Captive-Air, the tire is essentially a conventionally constructed four-ply nylon tire within which is a two-ply nylon-reinforced rubber shield. The shield, normally not touching the outer tire, expands under its own air pressure when a blowout occurs, taking up most of the slack of the deflated outer chamber.

Goodyear executives said it was the first tire of its kind developed anywhere in the world and should do away with the need of having a spare tire in the luggage compartments of automobiles. The tire may be incorporated as original equipment on some 1957 passenger cars.

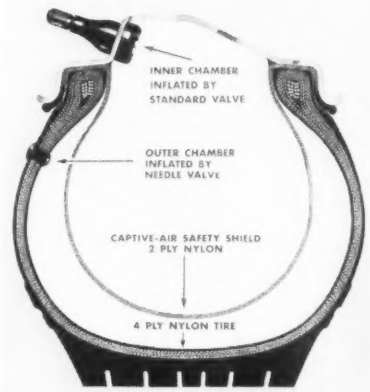
The tire will be introduced immediately in five widely spread cities: Kansas City, Mo.; Cincinnati, O.; Phoenix, Ariz.; Portland, Oreg.; and Charlotte, N. C. Other areas will be covered later, with nationwide sales not expected before another year.

The Captive-Air was demonstrated for reporters and subjected to extensive safety tests at the Goodyear Airport, Akron, June 5. Automobiles equipped with the tires were driven several times around the airfield after the tire treads had been slashed with knives, punctured at a run over spikes, and ruptured with dynamite caps.

Mounting, inflating, and servicing the tire were also demonstrated. In addition to a regular rim valve, the tire has a self-sealing valve in the sidewall, near the rim valve, by which the inner chamber is inflated first. Both chambers are inflated separately with about 24 pounds' pressure each.

Currently, Goodyear has on the market its LifeGuard tire, a double-chamber tire that differs from the Captive-Air in having a single valve for inflating both compartments. The LifeGuard is designed to convert a blowout into a slow leak and after puncture cannot be driven in safety for very long.

The Captive-Air is now being produced in sizes 6.70-15, 7.10-15, 7.60-15, and 8.00-15. The tire was said to have been successfully tested before its introduction by five commercial taxicab fleets in various sections of the country. The inner shield of the tire can be reused when the tire is replaced, but The Goodyear Tire & Rubber Co. is not selling the shield separately.



Cross-sectional drawing of Goodyear's Captive-Air tire

Koppers, French Contract

Contracts for the engineering design and operating knowledge of a polystyrene plant have been awarded Koppers International, C. A., by Houilleres du Bassin de Lorraine, Merlebach (Moselle), France, it was announced by George W. Naylor, vice president and general manager of the new international company of Koppers Co., Inc., Pittsburgh, Pa.

Koppers will provide all the engineering plans for the plant including specifications, detailed flow sheets of the operating process, and general plant layout. The plant will be located in the Moselle Department near a styrene monomer plant the French firm is building in Carling under license from Koppers.

C. P. Hall in Memphis

C. P. Hall Co. of Illinois, Chicago, Ill., has opened a new office and warehouse in the Patterson Transfer Co. Bldg., 648 Riverside Dr., Memphis, Tenn., according to S. A. Davis, company vice president.

Roger Pfau has been named manager of the office, and Lenoir Black has been appointed its technical representative. Mr. Pfau has serviced the area for the past six years. Mr. Black was formerly at the firm's Natchez, Miss., office.

Baumhart, Noe Join RUBBER WORLD Ad Staff

Paul T. Baumhart and Leon R. Noe, Jr., have joined the advertising department of RUBBER WORLD as eastern sales manager and sales representative, respectively.

Paul Baumhart sold advertising on a national basis for the *Cleveland Plain Dealer* for 15 years following his graduation from Oberlin, O., High School. He served in the Air Force from 1942-46, following which he was employed by the Hearst Publishing Co. until 1951. He was with Fairchild Publications for two years before joining the Bill Brothers Publishing Corp.'s *Tires-TBA Merchandising* in 1953. He will continue also as business manager of *Tires-TBA Merchandising*.

Lee Noe, a graduate of the University of Miami, Coral Gables, Fla., was in the Army from 1946 to 1948. From 1952 until 1956 he was employed as a salesman for the Celanese Corp. of America. He will continue as eastern sales representative for Bill Brothers *Plastics Technology* publication as well as for RUBBER WORLD.

Leon R. Noe, Jr.

Paul T. Baumhart

Form Industry Committee for New Medical College

Industry executives meet on behalf of the Albert Einstein College of Medicine. Seated, left to right, are Albert M. Kahn, Jack Faber, and Jerome B. Evans. Behind them are Herbert Muehlstein, Max J. Etra, and William Wishnick

A committee of top executives in the rubber, chemical, oil, and paint industries have been organized to campaign for financial support for the Albert Einstein College of Medicine of Yeshiva University, New York, N. Y., the nation's newest medical school and the first under Jewish auspices.

The committee includes Albert M. Kahn, Acme-Hamilton Mfg. Corp., chairman; Jack Faber, Paint Dealers Association, Inc.; Jerome B. Evans, Evans Bros., Inc.; Herbert Muehlstein, Herman Muelhstein & Co.; Max J. Etra, chairman of Yeshiva's board of trustees and overseer of its College of Medicine; William Wishnick, Witco Chemical Co.; Benjamin Farber, Farnow Varnish Co.; and Joseph Weiss, of Philadelphia.

The Albert Einstein College of Medicine is part of a $100,000,000 medical center now under construction which includes the Bronx Municipal Hospital Center recently completed by the City of New York and a Psychiatric Center to be built by the State of New York. The College admitted its first class last September.

Plan Safe Tire Campaign

"Safe Tires Save Lives" will be the theme of a new month-long tire safety campaign planned by tire industry leaders, tire dealer representatives, and the Inter-Industry Highway Safety Committee.

To get under way in mid-September, the campaign is being timed to give motorists tire safety reminders during the back-to-school season. Tire companies will work with their dealers and with dealer members of the National Tire Dealers & Retreaders Association in an industry-wide effort to get unsafe tires off the road.

Interchemical Buys Angier

Interchemical Corp., New York, N. Y., has acquired the industrial adhesives business of Angier Products, Inc., Cambridge, Mass. The acquisition involves the transfer of the Angier manufacturing facilities and other properties in exchange for Interchemical stock. Angier will operate as the Angier adhesives division of Interchemical Corp., with its present management and staff.

Eastman Sales Development

To accelerate new product development, Eastman Chemical Products, Inc., New York, N. Y., subsidiary of Eastman Kodak Co., has created a new chemical sales development section separate from its commercial sales department, according to J. E. Magoffin, sales manager for its chemical division.

William M. Gearhart, formerly chief chemist in charge of the service and development laboratories of the company at Kingsport, Tenn., has been appointed manager of the new section. R. B. Herring, formerly assistant to Mr. Gearhart, has been named to chief chemist in charge of the laboratories.

New Crepe Rubber Stowage Method Bans Fused Bales

What is said to be a new method of ship stowage for crepe rubber that prevents the bales from fusing to each other and eliminates the use of difficult-to-remove reed mats, coated paper, or plastic sheets has been devised by the Isthmian Steamship Lines at the suggestion of Insurance Co. of North America.

The method utilizes the two burlap identification patches on the top and the bottom of the bales as separators. The bales are loaded in the ship's hold on top of each other with the burlap sheets touching. The four sides of the bale, exposing the folds of the crepe, remain uncovered; the folds are less tacky than the flat surfaces of the rubber sheets.

Dubbed "on end" stowage, the method saves the cost of labor in separating fused bales and in removing embedded mats, paper, or plastic sheets, and speeds up deliveries of the rubber, according to Insurance Co. of North America. This stowage method also saves steamship lines the cost of purchasing separator material for each voyage.

Cargo of crepe rubber stacked "on end" in a freighter's hold to prevent fusion of the bales awaits unloading in the Port of New York. Note burlap patches on tops of bales

Making Industrial Items of Polyurethane-Type Disogrin

Compound No.	13	15	17	22	23	24
Shore hardness A	80	72	90	85	88	90
Resilience, %	50	60	33	40	37	37
Tensile strength, psi.	7230	5910	5470	5700	6300	6900
Elongation, %	680	750	540	630	690	670
Abrasion	35	31	33	22	26	26
Color	amber	blue	amber	amber	amber	amber

Gaskets, seals, O-rings, accumulator bladders, and other goods normally made of natural or synthetic rubbers are being manufactured from its own diisocyanate polyester elastomer formulation by Greer Industries, Inc., newly organized affiliate of Greer Hydraulics, Inc., Jamaica, N. Y.

Trade-named Disogrin, the elastomer, a non-spongy relative of the polyurethanes, is said to have unusually high tensile strength, extreme abrasion resistance, and resistance to ozone, oils, jet fuels, and radio-activity.

Available in six formulations, Disogrin is reported to have the physical properties that are shown in the table above.

In addition to the above-mentioned goods, Disogrin is being used to make metal reinforced scrapers, gears, bellows, tubing and rods, molded diaphragms, U-cups, check valve buttons, metal reinforced rollers, and shoe soles and heels. Special parts will be manufactured to customer specifications, Greer Industries says.

"D" Series by Claremont

A complete range of calibrated color pastes for vinyl compounding has been introduced by Claremont Pigment Dispersion Corp., Roslyn Heights, L. I., N. Y. Dubbed "D" Series, it has 55 white, yellow, orange, red, brown, green, blue, black, and metallic shades of a wide variety of chemical compositions and physical properties.

The colors are recommended primarily for use in a Banbury or a rubber mill vinyl compounding operation. Satisfactory performance in vinyl plastisol or organisol compounds is said to be obtainable by completely disseminating the colors in the compound by using a ball mill or three-roll paint mill.

Each paste has a smooth, buttery consistency designed for ease of weighing against predetermined color formulations, according to the company, and shows excellent storage stability and freedom from settling.

Koylon Mattresses Lower

United States Rubber Co., New York, N. Y., has announced retail price reductions on its Koylon foam mattress and foundations sets, ranging from $10.00 to $19.55 a set. The price cut was said to be "a move to build a still larger volume of sales" of the products.

The mattresses are being produced in the firm's Santa Ana, Calif., Mishawaka, Ind., and Woonsocket, R. I., plants, and are stocked in 28 major cities across the country.

Expanding Plaskon Facilities

Barrett Division, Allied Chemical & Dye Corp., New York, N. Y., plans substantial expansion of its production of Plaskon polyester and liquid phenolic resins at its Toledo, O., plant. The new facilities, expected to be completed by mid-1957, will more than double the polyester resin capacity and nearly quadruple the phenolic resin capacity.

Marlex Sales Offices Set

Preparatory to full-scale marketing of its Marlex polyethylenes, Phillips Chemical Co., Bartlesville, Okla., has opened six district offices in its plastics sales division. Commercial production of Marlex begins this fall at the company's 110-million-pound-per-year-capacity Adams Terminal plant now being constructed on the Houston Ship Channel in Texas.

Sites of the district offices and their managers follow: Pasadena, Calif., R. G. Askew; New York, N. Y., W. C. Douce; Akron, O., W. M. Larsen; Elmhurst, Ill., J. T. Roach; Providence, R. I., C. R. Scott; and Bartlesville, R. F. Uber.

Hewitt-Robins Center

A new center for consumer products research and development will be established by Hewitt-Robins, Inc., Stamford, Conn., in connection with the company's building expansion program at Franklin, N. J., where a urethane foam manufacturing plant is being erected.

Investigation will be conducted on molded foam rubber and slab foam, foam with fabric backing, plastic foam, seating problems and applications for the automotive and furniture industries, carpet cushioning, and rubber and vinyl floor tile, according to Hewitt-Robins.

French Get Koppers Data

Koppers International, C. A., Pittsburgh, Pa., has been contracted to supply a French firm with engineering plans for the construction of a polystyrene plant, as well as operating techniques, it has been announced by George W. Naylor, vice president and general manager of the international subsidiary of Koppers Co., Inc.

The French firm, Huiles, Goudrons & Derives, of Paris, will immediately put the technical knowledge of the American company into practice at its existing polyethylene plant on the west coast of France. Site of the yet-to-be-built French plant was not revealed.

Koppers operates a polyethylene plant at Kobuta, Pa. According to the terms of the contract, it will supply the French company with information on new developments in polyethylene manufacture as they become available.

THREE GOODYEAR SMILES vie with two Indonesian ones at a reception for Indonesian President Achmed Sukarno, center, at the Indonesian Embassy, Washington, D. C., in May. Flanking the President are, left to right, Mukarto Notowidigdo, Indonesian Ambassador; Peter Borlo, Washington representative for Goodyear Export Co.; C. H. Baker, assistant to the vice president of Goodyear Rubber Plantations Co., Akron, O.; and W. E. Klippert, manager, rubber plantations, The Goodyear Tire & Rubber Co., Akron, and vice president of Goodyear Rubber Plantations

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Because Polysar's quality, uniformity and customer service enable you to raise product standards and cut production costs. From a wide variety of Polysar types, you can choose the one best suited to your technical needs.

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- Special Purpose
- Latices
- Oil-resistant
- Butyl

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Polysar SS-250 and Polysar Krylene NS together provide the ideal basis for floor tile compounds. These two Polysar rubbers are the whitest Polymers available . . . are non-staining and non-discolouring. They permit easy dispersion of pigment and short mixing cycles. Polysar rubbers have improved floor tile—they can improve your products, too.

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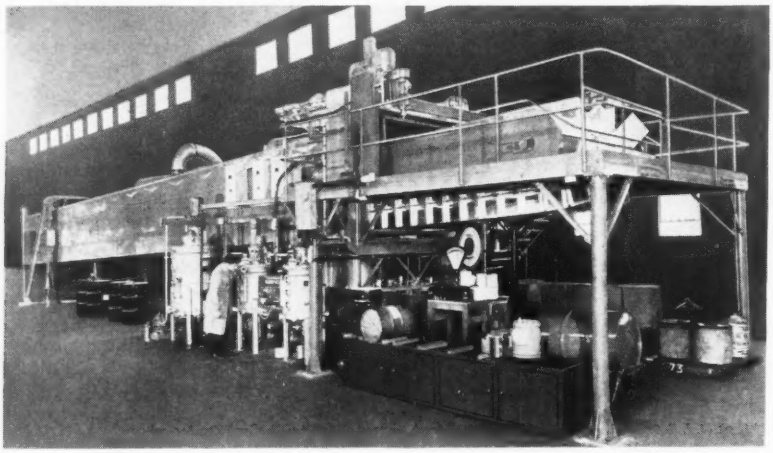
Huge Machine Boosts Dayton Polyurethane Foam Output



Dayton's 22-pound-a-minute polyurethane foam machine

Polyurethane foam is being made by The Dayton Rubber Co., Dayton, O., in a German machine capable of turning out 22 pounds of slab stock a minute, "one of the fastest production cycles in industry," the company says.

The unit, believed to be the first of its kind in this country, was designed and built in Germany for Dayton and is located at the firm's Marietta, O., plant, where it is expected to produce eight million pounds of foamed polyurethane a year.

A company subsidiary, American Latex Products Corp., Hawthorne, Calif., is said to be making two million pounds of polyurethane foam annually. Total yearly output of the product, marketed as Poly-Koolfoam, would be 10 million pounds.

Silicone Rubber Vulcanized by Electron Beam Method

A technique of vulcanizing silicone rubber by bombardment with a two-million-volt beam of electrons has been developed by three researchers at Westinghouse Electric Corp., Pittsburgh, Pa.

H. R. Sheppard, E. J. Croop, and G. C. Gainer, discoverers of the process, say it converts silicone gum into vulcanized silicone rubber in two seconds, compared with conventional vulcanizing methods which take several hours. The men are associated with the insulation and chemical engineering section of the company's materials engineering department.

In addition to time saving, the electron vulcanization technique does away with the introduction of chemical agents into the silicone rubber "which remain in the rubber and spoil some of its desirable properties, especially those required for electrical insulation," according to the Westinghouse researchers.

The ease and the precision of the technique, accomplished without heat, pressure, or chemicals are cited as other advantages. The high-energy electrons required for the process can be obtained from a standard electrostatic generator. The electrons cause cross-linking of the silicone rubber molecules, changing the gum into a solid rubber.

Although the process is not yet ready for commercial application, it eventually is expected to become an important method of vulcanizing silicones industrially. A detailed report on the technique will be made public in late summer.

New Campco Plastic Sheet Introduced to Trade

The availability of linear extruded polyethylene sheet and extruded copolymer styrene sheet has been announced by Campco Division of Chicago Molded Products Corp., Chicago, Ill. Applications of the two sheet plastics were shown to members of the press at Hampshire House, New York, N. Y., June 11, at the time of the announcement.

The extruded polyethylene sheet, made by both the Ziegler and Phillips processes, is suitable for sheet forming. The sheet is said to have excellent resistance to heat distortion, improved rigidity and impact resistance to chemical attack, including some acids.

The company predicted that the sheet would find application in industrial and consumer goods packaging, as well as in such vacuum-formed products as containers, trays, carboys, hospital equipment, machine housings, and housewares. Tensile strength of the Zeigler-type sheet is put at 3,200-3,500 psi.; while that of the Phillips type is 5,100 psi.

The extruded acrylonitrile copolymer styrene sheet, available in sizes up to $\frac{3}{16}$-inch thick, is said to have outstanding impact strength even at temperatures as low as —40° F., high tensile and flexural strength, a relatively high heat distortion point, and exceptional chemical resistance.

Available in a wide range of colors, the styrene sheet is expected to find application as machine housings, tote boxes, luggage, photo trays, and in automotive use, such as for panels, liners, and seat skirts. Tensile strength of the sheet is said to be 4,500 psi.

Du Pont Gets Court Nod

The United States Supreme Court has upheld the dismissal by a lower court of a complaint by the U. S. Department of Justice that E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., was monopolizing the manufacture and the sale of cellophane and cellulose caps and bands. The vote was four to three.

Du Pont's defense was that cellophane was only one of many competing packaging materials, such as waxed paper, glassine, foil, and other papers and films. The company also said that more than 85% of its cellophane sales were of moisture-proof cellophane, on which it holds basic patents.

Pine Chemicals' Oleoresin

The first commercial processing plant in the United States for the continuous distillation and refining of pine oleoresin is now being operated on the Delaware River at Fieldsboro, N. J., according to Pine Chemicals, Inc., plant owner.

Pine Chemicals, an affiliate of Filtered Rosin Products, Inc., Baxley, Ga., was recently formed to bring to New England and the Middle Atlantic States a more readily available supply of high-grade rosins and resins, the company says.

The products are being used in the rubber, adhesives, linoleum, protective coatings, paper, and other industries. The company gets its basic raw material, raw pine gum, from its parent firm. Specialty resins and resinates are now being developed and manufactured for marketing to the northeastern area.

Fred R. Gates is Pine Chemical's sales manager and a vice president of the company. Matthew L. Rue, Jr., the firm's general manager and a vice president, designed the Fieldsboro plant.

Goodyear Auto Air Spring

A rubber-bellows air spring that can be mounted on an automobile like a tubeless tire has been announced by The Goodyear Tire & Rubber Co., Akron, O.

By utilizing rim-like metal plates on car axle and frame and integral wire beads molded in the ends of the air bellows, the air spring can be snapped into place and sealed by air pressure, the company revealed.

The self-sealing feature is said to eliminate the cost of building in a bolt plate on car frame and axles and a corresponding flange on the air spring, cutting replacement costs and shortening installation time.

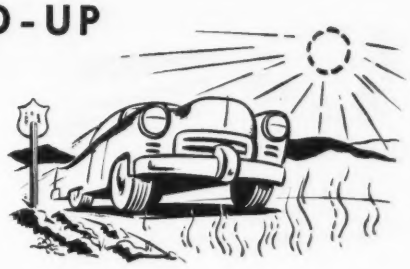
The rubber-bellows air spring developed by Goodyear will be only one part of complete systems, a company spokesman said. The final design of these systems will be made by individual automotive companies.

for less than 2¢ per tire

CIRCOSOL-2XH...

Helps Prevent HEAT BUILD-UP

Increased speeds have intensified the problem of heat build-up caused by flexure. By using Circosol-2XH® you get a more resilient rubber. This higher resiliency reduces hysteresis...lessens heat build-up...gives longer tire life.



Helps Eliminate TIRE SQUEAL

Squeal is a tread-design as well as a tread-compounding problem. The controlled balance of naphthenic and aromatic hydrocarbons in Sun's Circosol-2XH may answer your compounding problem...and...do it without sacrificing abrasion resistance or toughness.

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Circosol-2XH will give you tougher, more resilient rubber needed to make safer tires. Tests show that tires made with Circosol-2XH can take more impacts and a rougher all around beating than tires made with softeners of different composition.

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The cost of these extra advantages is low. Enough Circosol-2XH for an 8.00 x 15 size, 100 level tire costs less than 2¢ more than the cheapest softener you can buy. Get the full story on both the advantages and the low price of Circosol-2XH from your Sun representative. Or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. RW-7.

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More Hercules School Aid

Hercules Powder Co., Wilmington, Del., has given unrestricted grants-in-aid totaling $70,000 to 21 United States colleges and universities, bringing the company's annual contribution for education to more than $150,000.

In revealing the new grants, Albert E. Forster, president and board chairman of the company, said the funds were given to the chemistry or engineering departments of the institutions to be used at the discretion of the department heads.

Hercules, however, has suggested that the donations be used for such purposes as the purchasing of special equipment, travel expenses for technical meetings for the teaching and research staff, stipends for visiting lecturers, grants to staff members for summer studies, and grants to graduate students in emergency situations for the completion of theses and technical papers.

Enka Alters Plan Set-Up

American Enka Corp., Enka, N. C., has reorganized the technical and production functions of its plant on a two-operations basis, rayon and nylon, with five staff departments serving both operations.

In announcing the new plan of organization, E. M. Salley, Jr., plant manager, said that its objective is to separate rayon and nylon operations so that one manager will be responsible for planning and administering all production functions, including quality control, for each product.

W. J. D. Van Dobbenburgh has been appointed rayon operation manager; while Paul W. Markwood has been named nylon operation manager. P. H. Van Scherpenzeel and R. L. Parks will serve as rayon and nylon chief chemists, respectively.

Firestone 13-Inch Tires

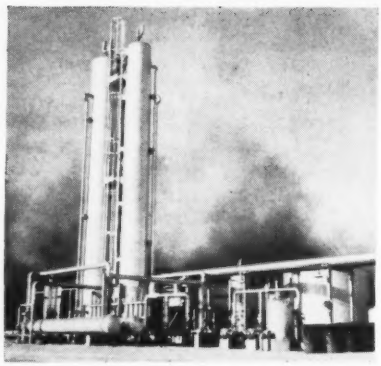
Tires for use on 13-inch rims of foreign-made cars have been made available from The Firestone Tire & Rubber Co., Akron, O. Sizes being offered are 5.20x13, 5.90x13, and 6.40x13. These are in tubed construction with either black or white sidewalls.

American-made automobiles use the 15-inch-diameter wheel rim, although some companies will introduce a 14-inch rim on 1957 automobile models.

American Felt Expanding

American Felt Co., Glenville, Conn., has announced the expansion of its felt specialties division and the appointment of E. P. Wenzelberger, a researcher in rubber and plastic products, as supervisor of the division.

Mr. Wenzelberger will make his headquarters at the company's Newburgh, N. Y., plant and will concentrate largely on the application of natural and synthetic latices and elastomers to felt, as well as the application of powdered and liquid resins to fibrous constructions of all types.



Water-treating towers rise above Continental Carbon Co.'s new SRF carbon black plant near Eunice, N. M.

Witco SRF Plant Opens

Continental Carbon Co., affiliate of Witco Chemical Co., New York, N. Y., has begun operations at its newly built 25-million-pound-a-year SRF carbon black plant near Eunice, N. M.

The facilities, using local natural gas as the raw material, will bring Witco's total production capacity of all grades of carbon black to about 300 million pounds annually, 90% of which goes into tires and other rubber goods.

The equipment of the new plant includes four gas-fired furnaces and auxiliary facilities, a gas-treating plant and control house, and a gas-collecting system containing 40 miles of piping. The warehouse and process area has 51,000 square feet of space, with an equivalent amount of space having been allotted to the furnace and collecting system.

Robert I. Wishnick, Witco's board chairman, presided at the opening ceremonies.

ALPCO Foam Expansion

American Latex Products Corp., Hawthorne, Calif., has completed the expansion of its foam rubber producing facilities that will add 1,200 tons to its annual output, according to C. W. Christie, president.

A 24,000-square-foot building was constructed to house such new equipment as a 100-foot automatic drying line supplied by steam pressure boilers, complete conveyor system, and additional facilities for fabrication, packaging, and shipping.

The new installations were said to be the company's first step in a planned five-year expansion program designed to maintain its West Coast leadership in the field.

Chemigum in Runway Use

Expansion joints in concrete runways for jet aircraft are being filled with a tar-rubber compound made by Studebaker Chemical Co., Elyria, O., it has been reported by The Goodyear Tire & Rubber Co., chemical division, whose Chemigum, a nitrile synthetic rubber, is used in the compound.

Called "SCCO" hot poured joint sealer, the product is said to meet interim federal specifications and is prepared by adding Chemigum latex to tar with certain plasticizers and catalysts. Goodyear says its Chemigum was selected for this application because of the rubber's resistance to oils, greases, gasolines, and jet fuels.

Expansion joints are needed in concrete runways for jets to prevent cracking. The runways are subjected to severe heat from the takeoff of the aircraft.

Chase Relocates Offices

Chase & Sons, Inc., manufacturer of electrical insulation materials and tapes, has moved its main offices from Randolph, Mass., to 26 Spruce St., North Quincy, Mass., where the company has one of its plants. The move was made to coordinate better the production, sales, and research facilities of the firm, it declared.

At the same time the company announced the following personnel changes and appointments: Leonard P. Graham, formerly chief chemist, to sales manager of the Chase cable tape division; James Cochrane, to technical representative in that division; Robert C. Graham, to sales manager of the laminated and reinforced insulation division; and Edward E. Stritter, formerly of Boston Woven Hose & Rubber Co., to succeed Mr. Graham as chief chemist.

Goodyear Philippine Plant

The Philippine tire plant of The Goodyear Tire & Rubber Co., Akron, O., has begun operations and is expected to reach full-scale production by the end of the year.

Located 12 miles from Manila, the one-story plant is 860 feet long and employs Goodyear-trained Philippine personnel. In addition to tires, tubes, and recapping materials, the facilities will also turn out Neolite and rubber shoe soling slabs and heels.

R. T. Budd is plant manager.

Goodyear has operated a rubber plantation in the islands since 1928, which currently has an area of 2,500 acres. The company will develop additional plantations elsewhere in the Philippines to help meet the natural rubber requirements of the new plant.

Rubber Division for Wilmod

Wilmod Co. Plastics Division, Toronto, Ont., has organized the Wilmod Rubber Division, which will operate in the United States and Canada, carrying a range of light, medium, and heavy rubber and plastics equipment supplied by Iddon Bros., Ltd., Leyland, England. John Williams has been named technical sales and service manager of the new division. He was formerly technical sales engineer with Francis Shaw (Canada), Ltd., and with Francis Shaw & Co., Ltd., of England.

Enjay Butyl—*today's fabulous rubber* gives new life to backyard wading pools

Enjay Butyl brings long life and performance strength to the sensational new Bil-O-Matic®, rubberized fabric wading pool manufactured by the Bilnor Corporation. With its resistance to aging, sunlight, tear and impact damage, the pool manufactured with Enjay Butyl gives outstanding performance. Unlike other pools that cracked and leaked after exposure to sunlight, these *new* pools retain their durability under even the toughest conditions of wear, stress, and weather. The Enjay Butyl label on the carton assures the customer of exceptional quality.

Extremely versatile, Enjay Butyl has led to improved product performance in a wide variety of fields. This amazing, low-cost rubber is *immediately available* in non-staining grades for white and light-colored applications. To find out where Enjay Butyl can *cut costs* and *improve your product*, contact the Enjay Company. Complete laboratory facilities, fully staffed by trained technicians, are at your service.

ENJAY BUTYL

Enjay Butyl is the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

ENJAY

Pioneer in Petrochemicals

ENJAY COMPANY, INC., 15 West 51st Street, New York 19, N. Y.

Other offices: Akron • Boston • Chicago • Los Angeles • Tulsa

News About People

William K. Taft, manager of the Government laboratories in Akron, O., operated by the University of Akron for the National Science Foundation, has joined the aviation division of Olin Mathieson Chemical Corp., New York, N. Y., in a research capacity. Seven other staff members of the Akron laboratories joined Mr. Taft in the move to Olin Mathieson. They are **Trescott B. Larcher, Wallace R. Mitten, A. D. Snyder, Dorothy C. Prem, June T. Duke, Norman S. Trommer,** and **Erwin Kniel.** The group will be stationed at the company's research laboratories at Niagara Falls, N. Y., where it will continue to work in the field of polymerization.

Howard K. Lambert has been named Cleveland district sales manager for Hobbs Mfg. Co., Worcester, Mass.

H. K. Cunliffe, formerly chief chemist of Mansfield Rubber (Canada), Ltd., has joined the Whitby, Ont., tire plant of Dunlop Canada, Ltd., succeeding **W. Matthews,** who has resigned.

Harold F. Shattuck has been reassigned to eastern technical manager for the organic chemicals division of Monsanto Chemical Co., St. Louis, Mo., and is now located in the firm's New York, N. Y., sales office.

E. J. Thomas, president and chief executive officer of The Goodyear Tire & Rubber Co., Akron, O., has been presented with the Silver Buffalo, "scouting's highest award for distinguished service to boyhood," by the National Council of the Boy Scouts of America.

Claude Ramsey, Jr., has been appointed production manager of the new Lowland, Tenn., rayon staple fiber plant of American Enka Corp., Enka, N. C., and has been succeeded as administrative assistant to the company's vice president for manufacturing by **Gale P. Wait.**

Howard O. McMahon, science director of Arthur D. Little, Inc., Cambridge, Mass., has been elected vice president of the company. He was awarded the Edward Longstreth Medal of the Franklin Institute in 1951 for his contributions to the development of the helium cryostat.

Howard K. Nason has been elected a vice president of Monsanto Chemical Co., St. Louis, Mo. In 1951 he was named director of research and development for the company's organic chemicals division.

C. F. Bingham

C. F. Bingham, W. E. Phillips, and **H. B. Brown** have been elected to the board of directors of Columbia-Southern Chemical Corp., Pittsburgh, Pa. Mr. Bingham is vice president of sales for the company. Mr. Phillips is a director of Pittsburgh Plate Glass Co., parent company of Columbia-Southern. Mr. Brown is a director and secretary of Pittsburgh Plate Glass.

Boyd W. Bullock has been appointed manager of marketing for the laminated and insulating products department of General Electric Co., Coshocton, O.

C. L. Martin has been promoted to superintendent of services, **Robert L. Axtell** to superintendent of production, **L. W. Jarrett** to supervisor of personnel and safety, and **Harvey A. Hammond** to general foreman at the Moundsville, W. Va., plant of National Aniline Division of Allied Chemical & Dye Corp., New York, N. Y.

Jerome C. Isham has been advanced to manager of the public relations department of Seiberling Rubber Co., Akron, O., succeeding **David R. Goldsberry,** who has resigned.

Stanley W. Bennett has joined Beebe Rubber Co., Nashua, N. H., as sales manager.

Morris A. Kimmel has been appointed executive assistant to the general manager of the Resinous-Reslac department, chemical division, Borden Co., New York, N. Y.

Wm. Howlett Gardner has been appointed manager of chemical literature for National Aniline Division of Allied Chemical & Dye Corp., New York, N. Y.

Willard F. Wadt has been named manager of the central sales division, headquartered in Chicago, Ill., of Enjay Co., Inc., New York, N. Y. He was formerly general superintendent of the Bayonne refinery of Esso Standard Oil Co.

Willard F. Wadt

Bruce K. Brown has been appointed president of Petroleum Chemicals, Inc., New Orleans, La. He was formerly deputy administrator of the Petroleum Administration for Defense.

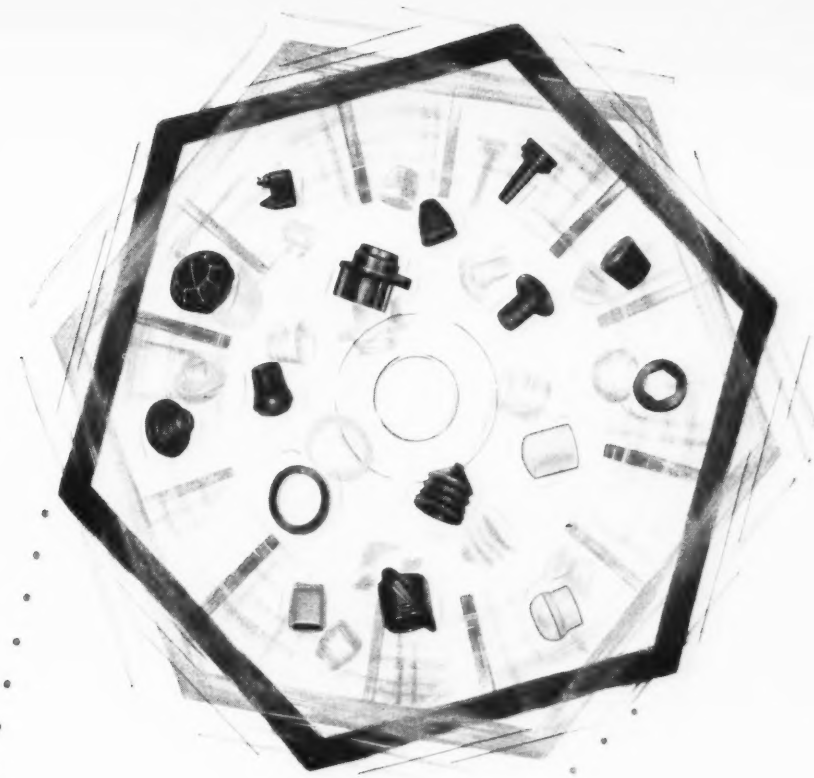
H. E. Cook, chief engineer at The B. F. Goodrich Co., Akron, O., since 1929 and associated with the company for 45 years, has retired. He supervised the building of Goodrich plants in Europe, South and Central America, and New Zealand, as well as in the United States.

Herman Behme has been named eastern manager of the market development department of Stauffer Chemical Co., New York, N. Y.

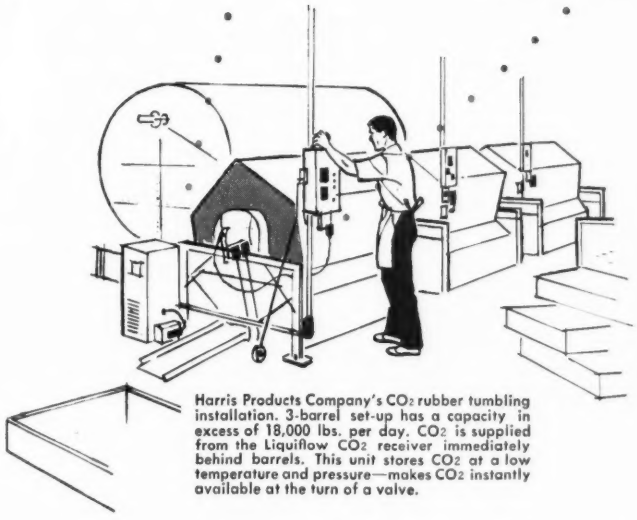
Richard F. Nugent has joined Hewitt-Robins, Inc., Stamford, Conn., as manager of urethane foam sales and development. He previously held a similar position with Curtiss-Wright Corp.

William A. W. Krebs, Jr., has been elected vice president of Arthur D. Little, Inc., Cambridge, Mass. He is also serving as director and secretary of the company's affiliate, Nuclear Metals, Inc.

O. C. Karkalits, John E. Zarembo, and **John P. Alden** have been appointed supervisors of process and economic appraisal, general analytical services, and technical information service, respectively, for the new Princeton, N. J., research center of the chemical divisions of Food Machinery & Chemical Corp., New York, N. Y.



"CO_2 TUMBLING CUTS OUR DEFLASHING COSTS 1/3 AND GIVES US TOP QUALITY,"



Harris Products Company's CO_2 rubber tumbling installation. 3-barrel set-up has a capacity in excess of 18,000 lbs. per day. CO_2 is supplied from the Liquiflow CO_2 receiver immediately behind barrels. This unit stores CO_2 at a low temperature and pressure—makes CO_2 instantly available at the turn of a valve.

reports the Management of Harris Products Company, a Division of Clevite Corporation, **Milan, Ohio.**

Flash-free in far less time – at far less cost. CO_2 tumbling is the *modern, automatic* way to remove flashing and rind from rubber products and components.

Ends expensive hand trimming. CO_2 tumbling makes costly, time-taking manual methods obsolete—frees valuable labor for more important work.

Complete information on CO_2 rubber tumbling, or on any CO_2 application, is promptly available from Liquid Carbonic upon request.

LIQUID CARBONIC, *as the world's largest producer, is a major supplier of CO_2 in all its forms, gas, liquid and solid (dry ice) to the foam rubber and plastics industries.*

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3130 South Kedzie Avenue • Chicago 23, Illinois

Richard B. Shaver

Ernest T. Handley has been appointed executive vice president of Firestone Plastics Co., Pottstown, Pa., and continues as general manager of the Pottstown plant. **Frank J. Groten** and **Kenenth L. Edgar** were named vice presidents in charge of chemical sales and Velon sales, respectively.

Walter M. Young has been named director of sales of Richardson Scale Co., Clifton, N. J., and has been succeeded as head of the electrical engineering department by **John Aquadro.**

Robert H. Wise, assistant comptroller of Goodrich-Gulf Chemicals, Inc., Cleveland, O., has been named comptroller of the company. He joined Gulf Oil Corp. in 1936 as an accountant at the firm's Philadelphia refinery.

James F. Hall, Jr., has been appointed industrial chemical sales representative in the Chicago area for Pittsburgh Coke & Chemical Co., Pittsburgh, Pa.

James F. Hall, Jr.

Richard B. Shaver and **Francis G. Falvey** have been advanced to technical sales representatives for the elastomers division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., in the Chicago and Akron districts, respectively. Also promoted in the division was **Donald H. Lutz,** to sales administrative assistant in the eastern district office at Trenton, N. J.

Francis G. Falvey

Frederick A. Gilbert has been elected president of Becco Chemical Division of Food Machinery & Chemical Corp., Buffalo, N. Y., succeeding **Max E. Bretschger,** who has retired after 30 years of service with the company. Dr. Bretschger, credited with the development of 100% hydrogen peroxide, will continue to act as senior technical adviser for the division.

H. H. Burrows

H. H. Burrows has been advanced to senior vice president of the rubber sales division of Raybestos-Manhattan, Inc., Passaic, N. J., and **R. B. Hazard** has been promoted to vice president and sales manager of rubber and packings. Also named were **S. J. Synnott,** to assistant sales manager of rubber products, and **C. V. Vetell,** to manager of rubber product sales.

Donald H. Lutz

L. R. Bingaman, J. R. Conaway, and **J. T. Ferguson** have been transferred to the Philadelphia, St. Louis, and New York sales districts, respectively, of Carbide & Carbon Chemicals Co., division of Union Carbide & Carbon Corp., New York, N. Y. Also reassigned were **M. M. Maupin,** to Houston; **A. Pros,** to New York; **R. A. Schongar,** to Newark; **D. P. Shannon,** to Chicago; and **R. S. Trebus,** to Kansas City.

Richard C. Burck has been promoted to product development supervisor for Mobay Chemical Co., St. Louis, Mo.

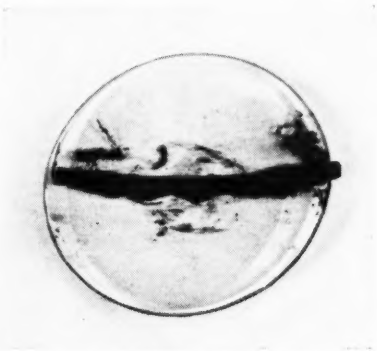
Fred W. Climer, vice president in charge of industrial relations for The Goodyear Tire & Rubber Co., Akron, O., has retired after 39 years of service with the company.

A. G. Heller has been appointed assistant to the vice president in charge of tire sales for The Dayton Rubber Co., Dayton, O., and **Gordon E. Williams** has been transferred to manager of Dayton replacement tire sales, succeeding **H. T. Goodenberger,** who has resigned. **M. D. Beetem** succeeds Mr. Williams as truck tire sales manager.

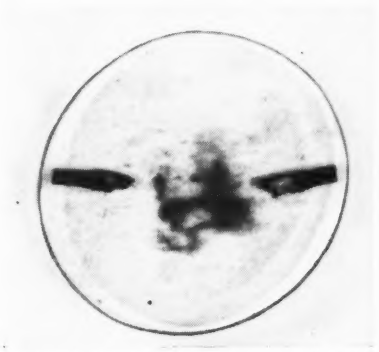
R. B. Hazard

KEL-F® ELASTOMER
IS SHATTERING IDEAS ABOUT RUBBER

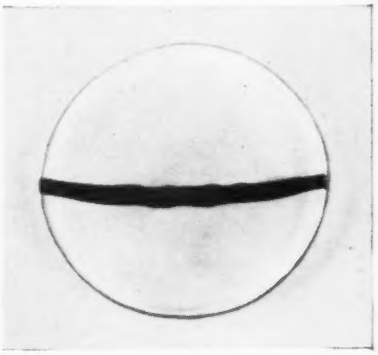
Challenging new fluorocarbon rubber has outstanding...
CHEMICAL RESISTANCE...HEAT RESISTANCE



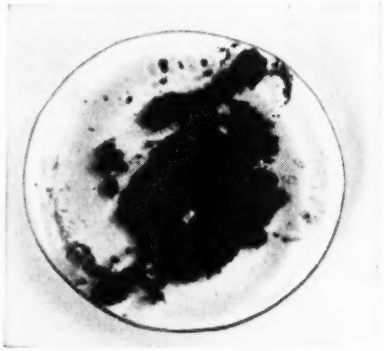
BUNA-N—10 min. immersion in RFNA



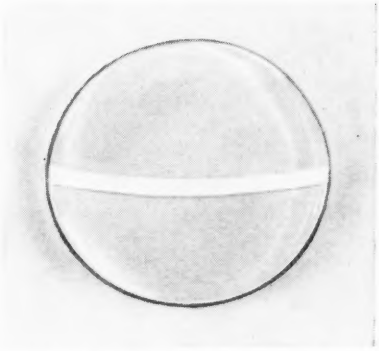
NATURAL RUBBER—10 min. immersion in RFNA



BUTYL—2 hr. immersion in RFNA



GRS—10 min. immersion in RFNA



KEL-F ELASTOMER—one week immersion in RFNA

IMMERSION IN RED FUMING NITRIC ACID for one week has no appreciable effect on the physical properties of KEL-F Elastomer. Extensibility and hardness remain virtually unchanged. Other available rubbers disintegrate within a matter of minutes.

When severe operating conditions demand a chemical rubber that *must* stand up under high temperatures and corrosive atmospheres—KEL-F Elastomer is the answer.

Developed by Kellogg, KEL-F fluorocarbon rubber combines superior elastomeric properties with excellent chemical resistance and thermal stability. Other outstanding advantages include: high chemical resistance to solvents, fuels and lubricants . . . low moisture absorption . . . non-flammability . . . excellent resistance to weathering and microorganisms.

This *unique* combination of properties makes KEL-F Elastomer useful in applications such as heat-and-chemical-resistant hose, tubing, diaphragms, gaskets, seals, tank linings, corrosion-resistant clothing, paints, flame-resistant coatings, and electrical insulation.

If your work requires an elastomer with outstanding resistance to heat and corrosion, look into KEL-F Elastomer. Our technical staff is prepared to assist designers, engineers, and production men in adapting KEL-F Elastomer to their individual needs. Kellogg supplies KEL-F Elastomer in the gum form only. Names of qualified fabricators of specific end uses of KEL-F Elastomer are available on request.

HOT OFF THE PRESS! *Our newly published booklet, "KEL-F Elastomer," is yours for the asking. Just fill out and mail coupon below for your free copy.*

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Send me a copy of your new booklet, "KEL-F ELASTOMER."

Name_____

Firm_____ Position_____

Address_____

City_____ Zone_____ State_____

W. Newlin Keen

W. Newlin Keen has been named assistant manager of the Akron district sales office of the elastomers division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. He succeeds **R. F. Harwick,** who has been transferred to the petroleum chemicals division.

William D. Zahrt, assistant treasurer of The Firestone Tire & Rubber Co., Akron, O., since 1929, has retired after 38 years with the company.

J. William Zabor has joined Wyandotte Chemical Corp., Wyandotte, Mich., as director of research. Dr. Zabor was formerly with Pittsburgh Coke & Chemical Co., where he served as director of research and development and assistant to the vice president of its chemical division.

Donald W. Moorhead, sales manager of commercial products for hotel, restaurant, and institutional use at The Wooster Rubber Co., Wooster, O., has resigned from the company.

Jacques Mercier has been appointed products manager of Greer Industries, Inc., Jamaica, N. Y., recently formed affiliate of Greer Hydraulics, Inc., Jamaica.

James R. Davidson has been appointed executive secretary of the Society of Plastics Engineers, Inc., Greenwich, Conn., succeeding **P. James Underwood,** who has resigned.

C. E. Yerkey has been named department manager of international manufacturing and technical services for International B. F. Goodrich Co., Akron, O.

Barry Topcik has joined Eberhard Faber Pencil Co., Newark, N. J., as chief chemist of its rubber division.

John O. Tragard has been appointed industry manager for rubber and plastics for Industrial Nucleonics Corp., Columbus, O.

Robert F. Kipp has been advanced to sales promotion head in the rubber industry for Oakite Products, Inc., New York, N. Y.

Robert F. Kipp

E. Randolph Kielich has joined Queen City Tulatex Corp., Burlington, Vt., as general manager. Formerly manager of the foam products division of The General Tire & Rubber Co., he also served with Dunlop Tire & Rubber Co. and American Latex Products Corp. Queen City manufactures long-fiber, resilient, rubberized cushioning for furniture, upholstery, automotive seating, and packaging of instruments.

Joseph W. Conlon has been appointed manager of the Rensselaer, N. Y., plant of General Aniline & Film Corp., New York, N. Y. **Bernard W. Rottschaefer** has been named production manager of the plant.

Robert S. Argyle

Robert S. Argyle has been named manager of advertising, sales promotion, and publicity for Dow Corning Corp., Midland, Mich., succeeding **Louis S. Putnam,** who will serve as an editorial and publicity consultant.

A. Bruce Boehm

A. Bruce Boehm, vice president of Enjay Co., Inc., New York, N. Y., and sales manager of its Butyl rubber division, has been elected to the newly created post of executive vice president. Before joining Enjay in 1947, he served with Esso Standard Oil Co. for 26 years.

Des Seymour has joined Wooster Rubber (Canada), Ltd., as chief chemist at its Cooksville, Ont., plant. He was formerly a salesman for Polymer Corp., Ltd.

Edward V. K. Jaycox and **Raymond P. Abouchar** have been transferred from the marketing research department of The Firestone Tire & Rubber Co., Akron, O., to its advance planning department.

William J. Sparks, director of the chemicals research division of Esso Research & Engineering Co., New York, N. Y., has received the Distinguished Service Award from his alma mater, Indiana University, for "outstanding distinction in the field of chemical research."

Raymond L. McCurdy has been assigned as special sales representative to the Cleveland district by the chemical division of The Goodyear Tire & Rubber Co., Akron, O.

Donald McIntyre has joined the polymer structure section of the organic and fibrous materials division of the National Bureau of Standards, Washington, D. C. He was formerly associated with Monsanto Chemical Co.

Howard L. Cromwell has been appointed manager of the Freeport, Tex., plant of Stauffer Chemical Co., New York, N. Y. He succeeds **Richard Owen,** now production manager of the company's eastern agricultural chemicals division.

A. R. Attebury, district manager for the steel and tube division of The Timken Roller Bearing Co., Canton, O., has retired after 22 years of service with the firm.

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in processing
Channel Black Stocks and Stocks with Low Black Loadings

DPG and MBTS

for low-cost acceleration . . .
good processing . . .
high modulus values in vulcanized rubber

plus... RETARDER PD

for processing safety under hot-weather conditions . . .
effective protection against scorching

Write for samples and Technical Bulletins.

SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • H. M. Royal, Inc., Trenton, N. J. • H. M. Royal, Inc., Los Angeles, Calif. • Ernest Jacoby & Company, Inc., Boston, Mass. • Herron & Meyer of Chicago, Chicago, Ill. • In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

CYANAMID

AMERICAN CYANAMID COMPANY

RUBBER CHEMICALS DEPARTMENT

BOUND BROOK, NEW JERSEY

Jay E. Miller has been advanced to manager of the speakers' bureau in the public relations department of The B. F. Goodrich Co., Akron, O., and is succeeded as western manager of public relations by **James McCready.**

Richard A. Riley has been advanced to general manager of World Bestos Division of The Firestone Tire & Rubber Co., New Castle, Ind., succeeding the late **William J. Nanfeldt.**

Russell R. Menard has been named to the post of manager of marketing administration in the plastics department of General Electric Co., Decatur, Ill.

Samuel Salem has been appointed manufacturing analyst for The General Tire & Rubber Co., Akron, O.

John W. Pike has been appointed eastern district manager of Struthers Wells Corp., Titusville, Pa.

David Rockefeller has been elected a director of The B. F. Goodrich Co., Akron, O. He is executive vice president of the Chase Manhattan Bank.

E. D. Lutz has been promoted to manager of flooring distributor sales for the films and flooring division of The Goodyear Tire & Rubber Co., Akron, O.

Andrew J. Link has been appointed midwestern sales representative for H. O. Canfield Co., Bridgeport, Conn.

Thomas M. Smithwick has been named export manager of American Viscose Corp., Philadelphia, Pa., succeeding the late **John W. Geary, Jr.**

A. E. New has joined Escambia Bay Chemical Corp., New York, N. Y., as director of the technical department of its manufacturing division at Pensacola, Fla.

James J. Lowe has joined Peters Mfg. Co., Wollaston, Mass., as general sales manager.

Donald E. Moat has been upped to director of marketing for Leeds & Northrup Co., Philadelphia, Pa.

Richard D. Mitchell has been appointed plant engineer at the Fremont, O., plant of Hewitt-Robins, Inc., Stamford, Conn.

Arthur F. Kuehn, Jr., has been advanced to assistant resident manager of the Manhattan Rubber Mfg. Co., Neenah, Wis., subsidiary of Raybestos-Manhattan, Inc.

Herbert M. Kelton, vice president, United States Rubber Co, New York, N. Y., has been reelected assistant treasurer of the Controllers Institute of America.

Pach Bros.

Jim J. Orr

Jim J. Orr has been advanced to assistant director of engineering for United States Rubber Co., New York, N. Y. He previously served as manager of plant engineering in the company's central engineering department.

J. Stewart Munro has been advanced to president of Raybestos-Manhattan (Canada), Ltd., subsidiary of Raybestos-Manhattan, Inc., Passaic, N. J., succeeding **Robert Abbott,** who has retired. Appointed vice president, replacement sales, was **Douglas Pocock,** formerly sales manager of the Canadian firm.

Obituaries

Philip L. Wormeley

Philip L. Wormeley, a prominent tire researcher, who in 1947 retired from the National Bureau of Standards after 37 years of service, died May 25 at the home of his daughter in Alexandria, Va., after a long illness.

At the time of his retirement, Mr. Wormeley was assistant chief of the division of organic and fibrous materials and chief of the section on testing and specifications of the National Bureau of Standards.

Best known for his research on tires, he contributed extensively to the fields of leather, rubber, and the development of federal specifications.

In collaboration with W. L. Holt, he did pioneer work on the endurance and dynamometer tests for tires and investigated power losses in tires and the effects of these losses on fuel consumption. A jointly written paper by these two men, "Wearing Qualities of Tire Treads as Influenced by Reclaimed Rubber," provoked wide controversy when first published, but the findings were subsequently confirmed by other researchers.

Alone, Mr. Wormeley authored many technical papers. His Circular 38 on the "Testing of Rubber Goods" has been for many years a standard reference work in the rubber industry.

Mr. Wormeley was one of the founders of the Division of Rubber Chemistry of the American Chemical Society.

He was born in Richmond, Va., February 17, 1878. He attended the University of Virginia, from which he was graduated in 1901 with degrees in mechanical and electrical engineering.

Before coming to Washington, D. C., he was associated with the New Amsterdam Gas Co. of New York and was professor of engineering, applied mathematics, and mechanical drawing at the College of Charleston, S. C.

He began his government career in 1904, serving as assistant engineer and engineer of tests in the Bureau of Chemistry of the Department of Agriculture. In 1910 the deceased moved to the Bureau of Standards. Starting as a technologist, he became successively, chief of the rubber and leather section, chief of the rubber section, chief of testing and specifications section, and assistant chief of the division of organic and fibrous materials. He served as chairman of the NBS rubber products committee and the gaskets and packing committee since their organization in 1921.

Mr. Wormeley is survived by a son, two daughters, five grandchildren, and one great-grandson.

Funeral services were held May 28 at St. Paul's Episcopal Church, Alexandria. Burial took place in Hollywood Cemetery, Richmond.

Ralph F. Anschuetz

Ralph F. Anschuetz, a Midwestern sales representative for Witco Chemical Co., New York, N. Y., for the past 17 years, died suddenly of a brain hemorrhage, May 29.

Mr. Anschuetz was graduated from Northwestern University in 1919 with a Bachelor of Science degree after seeing service in the United States Navy during World War I.

He was the publisher of the *Daily Oil News Report* before becoming associated with Texas Co. as a sales representative. He joined Witco in 1939.

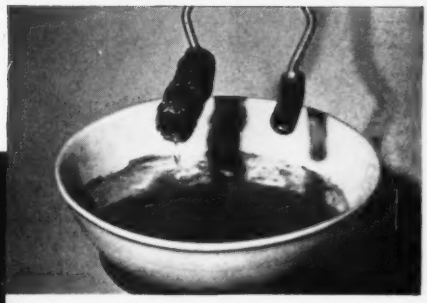
He was a member of the executive committee of the Chicago Rubber Group and belonged to the American Legion, Beta Theta Pi, and the Masonic Lodge. From 1930 to 1942 he was the organist and choir master of Trinity Episcopal Church in Highland Park, Ill. He was also an experienced football official in the Big Ten Conference.

The deceased was born in St. Louis, Mo., on March 4, 1897.

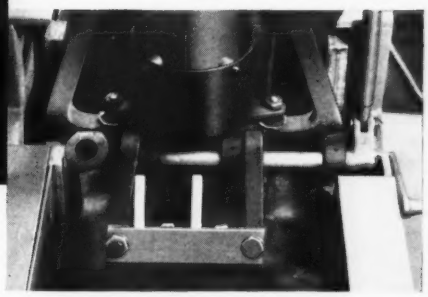
Funeral services for Mr. Anschuetz were held at St. Louis, on June 1, with a memorial service being conducted at an Evanston, Ill., chapel on June 4. He was cremated at the New St. Marcus Cemetery, St. Louis.

Surviving are his wife and mother.

SILASTIC GUMS
give you 4 outstanding properties

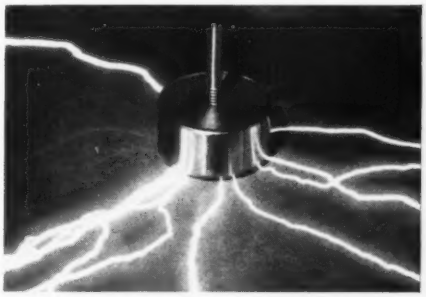


Stability at 500 F.



Elasticity at—100 F.

Minimum compression set over a span of 600 degrees



Excellent dielectric properties at Class H temperatures

Built-in low compression set — no toxic additives. Complete serviceability at temperatures ranging from —100 F. to 500 F. Excellent dielectric characteristics regardless of severe weathering, corona, ozone, heat or moisture. High tensile strength with silica fillers. These are the properties of *Silastic* Gums*, the Dow Corning silicone rubber gums that help you make better-performing products.

Easier PROCESSING means lower production costs

Easy-to-compound Silastic Gums reduce processing time, assure most efficient use of your mills, save capital investment in extra equipment. Dow Corning's 10 years of experience in compounding silicone rubber is at your service either in the field or at Midland, Michigan. You are invited to see first hand how to compound with Silastic Gums.

Complete line of silicone rubber RESEARCH materials available

Dow Corning offers the most complete line of silicone rubber gums to be found—sulphur vulcanizing, peroxide vulcanizing, fluid types. Always available in sample quantities.

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Company_____

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City_____ Zone_____ State_____

News Briefs

United Carbon Co., Inc., Charleston, W. Va., has opened a West Coast sales office at 3932 Wilshire Blvd., Los Angeles 5, Calif., with Burton S. Smart, Jr., formerly of the Memphis sales office, in charge.

General Electric Co., silicone products department, Waterford, N. Y., has reduced the price of its SM-33, SM-55, SM-61, and SM-62 silicone mold release emulsions 4-10c a pound. They now cost $1.22 a pound when packaged in 55-gallon drums.

National Aniline Division, Allied Chemical & Dye Corp., New York, N. Y., has begun full-scale operations at the second unit of its new Moundsville, W. Va., aniline plant, doubling the capacity of the facilities.

Goshen Rubber Co., Inc., Goshen, Ind., according to Elmo E. Niccum, president, is completing a plant enlargement and modernizing program costing about $500,000. Improvements include a 24,000-square-foot increase in floor space, additions to molding, processing, and power-plant equipment, and the doubling of silicone product fabricating capacity.

The Goodyear Tire & Rubber Co., Akron, O., has transferred its racing tire headquarters to 4013 W. Third St., Dayton, O. Harry T. Goodenberger is in charge.

Minnesota Mining & Mfg. Co., St. Paul, Minn., has opened a new sales office and warehouse at Los Angeles, Calif., with W. O. Bergstrom as manager.

M. W. Kellogg Co., New York, N. Y., has moved the Chicago, Ill., sales offices of its chemical manufacturing and chimney divisions to 221 North LaSalle St.

American Mineral Spirits Co., Chicago, Ill., has opened a sales office and solvents and chemicals terminal at 1500 Carbon Ave., Baltimore, Md., under the management of Donald J. McIntyre.

The B. F. Goodrich Co., Akron, O., has been awarded a U. S. Air Force contract for aircraft brakes and wheels amounting to $1,620,000. The order calls for 1,100 wheels and 3,980 brakes for fighter aircraft.

American Viscose Corp., Philadelphia, Pa., conducted its fourth seminar for textile institute faculties at its textile research department, Marcus Hook, Pa., June 18-20.

Allied Chemical & Dye Corp., New York, N. Y., has begun construction of a new textile fiber application research unit near its National Aniline Division's Chesterfield Plant, Hopewell, Va. The building, to contain 20,000 square feet of floor space, will be devoted to application research on the firm's Caprolan nylon fiber.

Borden Co., New York, N. Y., is offering commercial quantities of methyl acetate through the Polyco-Monomer department of its chemical division. The compound, used in organic chemical synthesis, is an acetylating agent and replacement for ethyl acetate.

Heyden Chemical Corp., New York, N. Y., will build a new resorcinol plant at Fords, N. J., with an annual capacity of 3,000,000 pounds. Completion is expected by December, 1957.

Rubber Corp. of America has moved its general and sales offices to 225 Broadway, New York 7, N. Y.

Gardena Rubber Co., Gardena, Calif., has been newly organized and will specialize in custom molding.

Financial

Dayton Rubber Co., Dayton, O. Six months ended April 30, 1956: consolidated net profit, $1,093,299, equal to $1.49 each on 703,134 common shares, against $963,558, or $1.42 each on 587,652 shares, a year earlier; net sales, $34,321,742, against $39,417,721.

The Firestone Tire & Rubber Co., Akron, O., and subsidiaries. Six months ended April 30, 1956: net profit, $27,140,605, equal to $3.33 a common share, compared with $22,330,210, or $2.76 a share, in the 1955 months; net sales, $532,070,658, against $519,508,494.

The Glidden Co., Baltimore, Md. Nine months to May 31, 1956: net earnings, $5,689,909, equal to $2.48 a share.

Lee Rubber & Tire Corp., Conshohocken, Pa., and domestic subsidiaries. Six months ended April 30, 1956: net earnings, $736,495, equal to 86¢ a common share, compared with $657,100, or 77¢ a share, a year earlier; net sales, $21,487,434, against $19,819,617.

Mansfield Tire & Rubber Co., Mansfield, O. First quarter, 1956: net profit, $309,202, equal to 49¢ a share, contrasted with $534,610, or 97¢ a share, in last year's quarter.

Taylor Instrument Cos., Rochester, N. Y. Nine months to April 30, 1956: net income, $435,470, equal to $2.31 a share, contrasted with $1,104,932, or $5.85 a share, a year earlier.

Scientist Shortage

(Continued from page 577)

Motors Corp. and president of the Foundation; Clifford Furnas, assistant secretary of the Department of Defense; Herbert Scoville, Jr., assistant director of the Central Intelligence Agency.

Also Lee A. du Bridge, president of California Institute of Technology; M. H. Trytten, director of the Office of Scientific Personnel of the National Academy of Sciences, National Research Council; Charles B. Jolliffe, Radio Corp. of America; and George W. Best, director of chemical research for Ethyl Corp.

The National Committee for the Development of Scientists & Engineers was established by President Eisenhower in April as an action group representative of major citizens' organizations concerned with education, training, and the utilization of scientific and engineering personnel.

NSC Rubber Meet Agenda

The National Safety Council, which is presenting the forty-fourth National Safety Congress and Exposition in Chicago, Ill., October 22-26, has announced the agenda of its Rubber Section, scheduled to meet at the Congress on October 22 and 23.

Subjects of round-table discussions and their presiding chairmen include the following: "Training Supervision," W. J. Dooking, Hood Rubber Co.; "Power Tractors," R. S. Farnum, United States Rubber Co.; "Fire Safety in Rubber," George Burkhardt, The General Tire & Rubber Co.; "Safety in Reclaim Plant Operations," R. M. Boyle, Midwest Rubber Reclaiming Co.

Also "Personal Protective Equipment," Ed Turner, The Goodyear Tire & Rubber Co.; "Safety in Mechanical Goods Manufacturing," J. C. Milarch, Corduroy Rubber Co.; "Health Hazard of New Chemicals," R. H. Wilson, The B. F. Goodrich Co.; and "Safety in Synthetic Rubber and Raw Material Operations," G. T. Shuster, Texas-U. S. Chemical Co.

W. M. Graff, U. S. Rubber, will preside over the Rubber Section's activities.

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News from Abroad

Around the Rubber World

By L. Thakar

(This is the third in a series of on-the-spot reports on the rubber industry in the Far East by RW's foreign news editor and covers the Japanese scene. India and Malay were previously surveyed.)

TOKYO, Japan. The *Flying Enterprise II* docked in Kobe on May 5. My schedule called for visits to rubber goods manufacturers in Kobe, Tokyo, and Yokohama.

SR in Japan

The Japanese rubber industry has been slowly recovering from the decimation of the war. Consumption of new rubber of all types during 1956 is expected to be about 100,000 tons, of which synthetic rubber will account for 6%. By 1960 it is believed that consumption will rise to at least 120,000 tons, of which 8,000 tons will be natural rubber latex; Hycar and butyl rubber, 4,000 tons; and SBR types, 16,000 tons. It is thought that of the total rubber consumed in 1960, about 30%, or 40,000 tons, may be synthetic rubber of all types; that is, if prices remain about as at present.

This anticipated increased percentage of synthetic has prompted plans for domestic production of synthetic rubber. Three firms are actively interested in developing the new industry: Mitsubishi Chemical Co.; Furukama Chemical Industry; and Sanyo Chemical Industry. Mitsubishi and Sanyo may form a joint company. Total annual capacity of the proposed ventures may be 30,000 tons, mostly of SBR types, and some of butyl.

Plans for a synthetic industry have not met with universal approval. Some manufacturers here fear that Japanese synthetic rubber may be inferior to others, in view of the fast-moving development of new techniques abroad and the lateness of the Japanese entry into the field, but that they nonetheless may be compelled to use the product.

With the loss of Japan's natural rubber producing areas, all of the material consumed is now being imported. Forty per cent consists of RMA No. 3; 20% of the No. 2 grade; 15% each of RMA Nos. 1 and 4; and the remaining 10% of RMA 5. The grading and the packing of the rubber have shown some improvement, but still present problems, and the Japan Rubber Arbitration Committee has been formed to establish rules and to help settle disputes. The organization is the Japanese equivalent to the Rubber Trade Association in the United States.

This view of the industry as a whole was given to me on May 7, two days after my arrival in Japan, by K. Okada, managing director of the Japan Rubber Manufacturers' Association, when I visited Tokyo.

Nikka Rubber Co.

After I had disembarked at Kobe, one of my hosts, Mr. Mariyama, representing Nikka Rubber Co. of Kurume, on the island of Kyushu, told me about his firm. Nikka was founded in 1873 and is today Japan's foremost manufacturer of rubber and canvas footwear, producing 24 million pairs annually. Its products account for 70% of the country's footwear exports, which go mostly to the Near East, Africa, and Canada, as well as to the United States. In addition to the Kurume plant, the company has two other facilities and employs a total of 5,500 persons. Its monthly rubber consumption is between 300 and 500 tons, of which about 10% is synthetic imported from the USA and Canada.

Bando Rubber Co.

My visit in Kobe was to Bando Rubber Mfg. Co., which has two plants in the city. I was accompanied by the Messrs. Enami, Sasabe, and Nakano, three top executives of the firm. Founded in 1901, Bando is one of the oldest rubber companies in Japan and is one of the country's two largest belting manufacturers; the other is Mitsubishi Belting, Ltd., of Kobe. Bando's current line of rubber products includes conveyor belts, footwear, hose, and bicycle tires and tubes. The company has recently begun to make flexible and rigid vinyl sheet and vinyl-topped conveyor belts for the food industry.

Most of the equipment in the plants are prewar. Only two of the heavier machines are American; the rest, Japanese and British. The belting section of one of the plants has ten vulcanizers, including British three-column-type machines. Cotton and high-tension rayon are used in the conveyor belts, depending on their purpose. The V-belts are constructed of a single layer of high-tension rayon cable cord passing horizontally through the cross-section and are said to be five times as durable as multiply V-belts.

In the bicycle tire section most of the employes were girls, as in so many Far Eastern plants I had seen. A good deal of the work was done by hand. This included the cutting of bias strips, assembling of the tire, and most of the fabrication of the inner tubes.

In the second Bando factory I visited, transparent and colored PVC sheet was being made, in addition to rubber products. The flexible sheet came in thicknesses of 0.05- to 0.5-mm.; the rigid sheet in thickness of 0.5- to 20 mm. The heaviest rigid sheet is used to replace metal as bed plates for small machines in the chemical industry. The thinner sheets serve for ventilators and furniture tops.

Bando consumes about 100 tons of rubber monthly, 15% of which is synthetic imported from the United States. The company makes its own reclaimed rubber, by the oil process, from old tires imported from the U. S. The powdered fabric separated from the ground rubber is used in part in the manufacture of rubber shoe soles.

Bridgestone Tire Co.

In Tokyo I visited the offices of Bridgestone Tire Co., Ltd., one of Japan's major tire producers, and received an appraisal of the tire industry from K. Enomoto, assistant to the president. Bridgestone, Yokohama Rubber Co., Ltd., and Dunlop Rubber Co. (Japan), Ltd., together produce 80% of the nation's tires. The remaining 20% is made by Tokyo Rubber Industry Co., Ltd.; Ohtsu Rubber Industry, Ltd.; and Nitto Tire Co., Ltd. Bridgestone alone supplies 40% of Japan's total output. It is Japanese owned; while Dunlop is wholly British owned, and Yokohama is apparently controlled by The B. F. Goodrich Co., which has 35% of the voting stock. The Goodyear Tire & Rubber Co. has an agreement with Bridgestone for exchange of technical information.

Bridgestone is the largest producer of foam rubber articles in Japan and also makes bicycle tires, automobile shock absorbers, golf balls, and retreads for tires of the American Armed Forces. I was scheduled to visit its plant the following day.

Yokohama Rubber Again

Later I went to the Tokyo offices of Yokohama Rubber Co. and was told about the operations of the company by its president, K. Oyama, and its executive director, K. Nakane. Yokohama is the oldest of the big local tire manufacturing concerns, having been established in 1917. Its original factory in Yokohama was bombed during the war, and it now has four plants, its largest at Hiratsuka, near Yokohama. The company employs 3,229 persons. Its monthly rubber consumption is about 300 tons.

Kinugawa Rubber

I spent the rest of the afternoon in the plant of Kinugawa Rubber Industrial Co., Ltd., Japan's largest toy manufacturer. Its monthly export of toys is valued at $40,000, half of which goes to the United States. Production of about 1000 of the simpler toys an hour was observed. The company also makes mechanical rubber goods. In this section, an interesting adaptation of vacuum molding caught my eye. A calendered sheet of the required size was carefully draped by two men over a ridged and minutely perforated mold coated with silicone mold release agent. The underside of the mold was fitted with a short metal pipe connected to a vacuum pump. After

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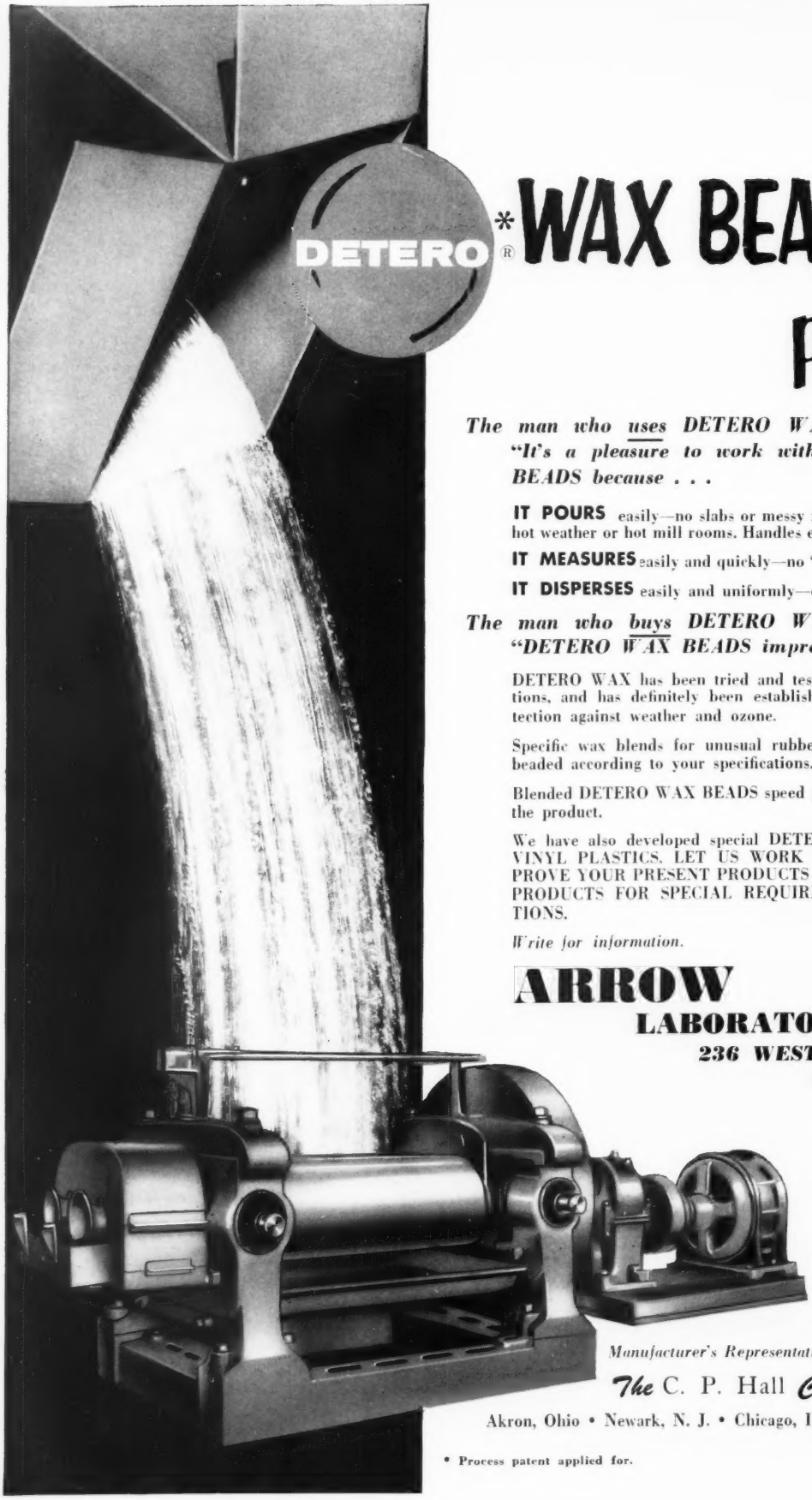

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the vacuum caused the surface of the rubber to be properly embossed and formed, the excess rubber was cut off, and vulcanization followed.

Another Bridgestone Plant

The next day I visited the Totsuka plant of Bridgestone and the Hiratsuka facilities of Yokohama Rubber, both on the environs of Yokohama. Although somewhat smaller than Bridgestone's Kurume plant, the Totsuka facilities have fairly new American machinery and testing apparatus and are substantially mechanized. Seven-hundred are employed here. Half of the plant's production is tires. Foamed rubber mattresses and cushioning, automobile shock absorbers, and golf balls compose the rest of the production schedule.

Yokohama Rubber Again

At Yokohama Rubber's Hiratsuka plant I was met by the Japanese technical director and two American advisers from B. F. Goodrich. The plant was thoroughly modern and extremely well equipped. The testing laboratories included an electron microscope for carbon black and zinc white.

The tire producing section was then being renovated to permit straight-line production. The plant's facilities turn out belting, hose, tank linings, foam rubber goods, PVC items, and mechanical goods, in addition to tires and tubes. Rayon is used in tire cord, and some nylon is being employed for truck tire bodies. About 8% of SBR type latex is added to natural rubber latex for stability in dipping tire cord and in making foam rubber. A continuous method is used for coating both sides of the tire fabric in one process.

To Build SBR Plant

Eight member companies of the Furukawa financial group plan to form a concern tentatively called Furukawa Chemical Industry Co., capitalized at about $20,000,000. The firm will build a synthetic rubber processing plant in Kuasaki to cost $8,300,000; a polyethylene and ethylene oxide plant at Ogu to cost $2,800,000; and a synthetic wool plant at Niigata, to cost $8,300,000.

1956 Export Target Set

The export target for rubber products for the 1956 fiscal year which started in April has been set at US$25,900,000 by the semi-official Export Council, according to the Japan Rubber Manufacturers' Association. The new target is 23% higher than 1955's exports.

The Association says that exports of rubber products during the past few years have developed favorably. The value of export shipments of rubber products during 1955 totaled US$20,200,000, a 44% increase over that of the previous year.

The Association reports that 37.3% of the total exports in 1955 were shipped to the dollar area, 32.3% to the Sterling area, and 29.7% to the open account area.

Malaya

Deadlocked Wage Talks Put Slowdown Truce in Danger

The Federation-wide slowdown by estates' workers subsided in mid-June as representatives of the National Union of Plantation Workers and the Malayan Planting Industries Employers Association met to discuss terms of a new wage agreement. Workers on some 40 estates, however, were reported still to be resisting the orders of union leaders to stop striking.

Spokesmen for both sides revealed that negotiations were proceeding with difficulty. The MPIEA openly threatened to cut wages still further in accordance with the drop in rubber prices if the talks became stalled. On the other hand it voiced its willingness to submit to arbitration if an agreement was slow in coming.

While the parlay continued, a union leader declared that the strike had caused a substantial number of workers to join the labor organization. He said most of the newly enrolled members were Chinese. Almost all members of the NUPW are Malays and Indians. In the past the Chinese have shown a reluctance to join the union.

The labor situation became more troubled late in May when 164 workers at the Harrison & Crosfield latex factory at Petaling, near Kuala Lumpur, went on a wild-cat strike, bringing the installation to a standstill. The strike quickly spread to the company's factories at Port Swettenham and Batu Anam. The firm's Sungei Klah factory has been struck since May 14.

Although the NUPW has said the plantation workers will not be ordered on a general strike if the wage talks fail, it has held forth the possibility of a stepped-up slow-down. This would involve stoppage of work three days a week, on alternate days. Many planters believe such a three-day stoppage would force all but the largest plantations to halt operations.

Natural-Synthetic Parlay?

The retiring president of the Malayan Estate Owners' Association has urged the Federation's Chief Minister, Tengku Abdul Rahman, to seek a conference with British and American Government representatives on the future of natural and synthetic rubber.

Dato Sir Clough Tuhraisingham told the annual meeting of the Association that such a conference should try to effect the stabilization of prices and the elimination of wasteful competition between the two products.

Declaring that the declining use of natural rubber affects the standard of living of millions of Asians, he asked: "Is this cut-throat competition really necessary, and is not the fate of millions of Asians the concern of America and the West?"

"Magnetizing" Crop Duster

Growing interest by planters in a new apparatus for dusting crops by "magnetized" insecticide has been reported by the *Straits Times*. The technique is said to result in more efficient use of insecticides and fungicides.

(*Continued on page 620*)

Mrs. L. Thakar, RUBBER WORLD's foreign news editor, fourth from left, at Miyanoshita, near Tokyo, with, from left to right, Mr. Kubota, technical manager, Yokohama Rubber Co.; and Miss Tokumi, of the same company; R. E. Johnson, technical advisor, Yokohama Rubber; and, on the extreme right, B. R. Okada, Japan Rubber Manufacturers' Association

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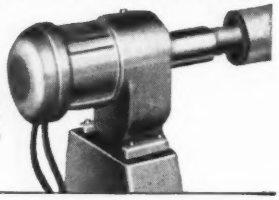

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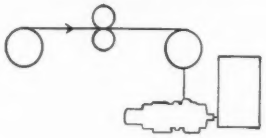

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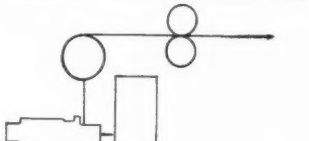
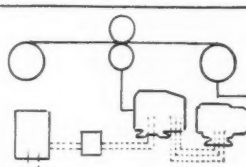


FOR VARIABLE PROCESS SPEED APPLICATIONS— Electrical Winding Unit*



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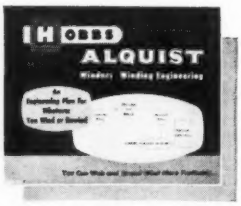

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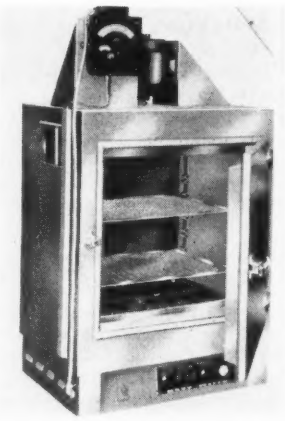
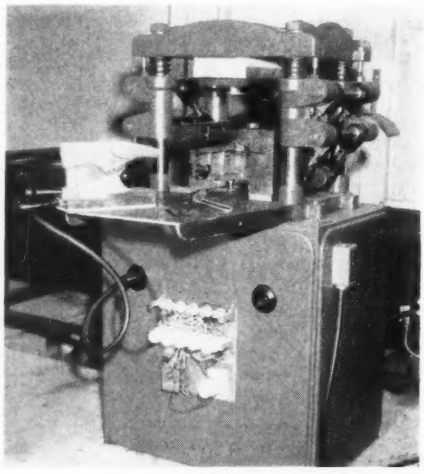


Blue M Stabil-Therm Hi-Heat mechanical recirculating oven



Goliath automatic shoe vulcanizer

Swedish Automatic Shoe Vulcanizer

An automatic shoe vulcanizing machine, made by A. B. Svenska Skolastfabriken, of Sweden, is being sold in this country by Gidley Laboratories, Inc., Fairhaven, Mass. Called Goliath, the shoe vulcanizer is said to supersede the hand-assembly, stitching, cementing, and autoclave vulcanization of all types of footwear. Two of the machines can be operated by one workman, who can turn out more than a shoe a minute with proper layout and formulae, according to Gidley.

Operating on what is called a "unique Synchro-Slide," the vulcanizing machine is said to produce uniform and powerful three-way pressure closure, with all mold surfaces being electrically heated and controlled by integral thermostats. An automatic cycle controller operates all three stages of the machine functioning independently of the operator. Warning signals alert the operator to any section of the shoe not receiving proper curing. Remote control warnings can also be installed. The Goliath may be operated from existing hydraulic plant systems, or it can be furnished with an independent hydraulic pump unit.

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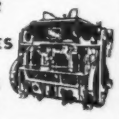

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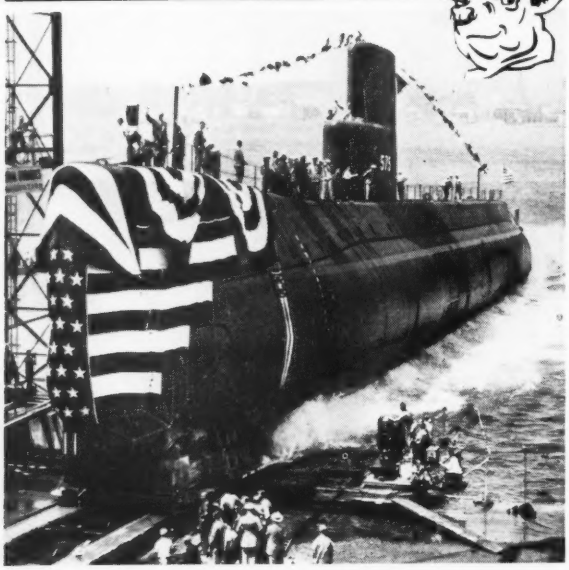
Creative Engineering

Another coating problem solved by Borden . . .



how a Borden chemical helped "launch" the atomic Seawolf

THE instant the Seawolf started her initial dive under the sea, a Borden chemical started protecting the Navy's mighty guardian of our shores from a constant enemy—corrosion in vital ballast tanks.

Here's the inside story: A submarine must flood sea water into her ballast tanks to dive . . . then blow it out in order to surface. Therefore, these tanks must be lined with a dependable coating resistant to the corrosive attack of sea water. To assure this vital protection, Borden's Resinous-Reslac Department furnished a coating that has been used for years in submarines . . . and has proved its superiority beyond question.

This submarine "protector" is but another example of Borden's creative chemistry at work in the coating field. If you have a product that may be developed or improved through use of the right resin emulsion, solution, or hot melt for adhesive bases, binders, coatings, sizes and saturants, take advantage of Borden's experience. *If time is of the essence . . . phone us and we'll have a technical representative at your plant within 48 hours.* The Borden Company, Resinous-Reslac Dept. RW-76, 103 Foster St., Peabody, Mass. In Chicago: Resinous-Reslac Dept., 3634 W. 38th St., Chicago 32, Ill. In Canada: American Resinous Chemicals of Canada Ltd., 20 Trent St., Toronto, Canada.

RESINOUS-RESLAC DEPARTMENT

©T. B. C.

THE *Borden* COMPANY

CHEMICAL DIVISION

Taylor Timed-Program Control Units

An automatic program controller said to accommodate any number of operating functions has been placed on the market by Taylor Instrument Cos., Rochester, N. Y. Called Flex-O-Stepper controller, it is designed for use with the company's Flex-O-Timer automatic sequence controller, but may be used alone for actuation by push-button or other momentary contact. The Flex-O-Stepper provides step actuation of solenoid switches and air valves in any combination to control a process program automatically.

The Flex-O-Timer, model 350RJ, has a cycle range adjustable through simple change gear to dials calibrated for 15, 30, or 60 minutes for the high-speed range, and one, two, or four hours for the low-speed range. A time disk automatically resets to zero in a maximum of 13 seconds when the time has completed the cycle. The step disk provides 20 numbered slotted positions for mounting "off" or "on" cams to actuate functional latch operators. The Flex-O-Timer has been designed for application to tire and tube presses, but with a different wiring circuit it may be used on platen presses or other plant processes requiring an adjustable timed-program control.

The Flex-O-Stepper, available in models 356RJ1 and 356RJ2, operates simultaneously and in phase with the Flex-O-Timer. Any number of these controllers can be used with the Flex-O-Timer to provide the required number of functions. According to the company, formerly complex control systems requiring an infinite number of functions become relatively simple with the Flex-O-Stepper, yet provide positive action of time functions, are speedily set up, and automatically repeat their timed and step program.

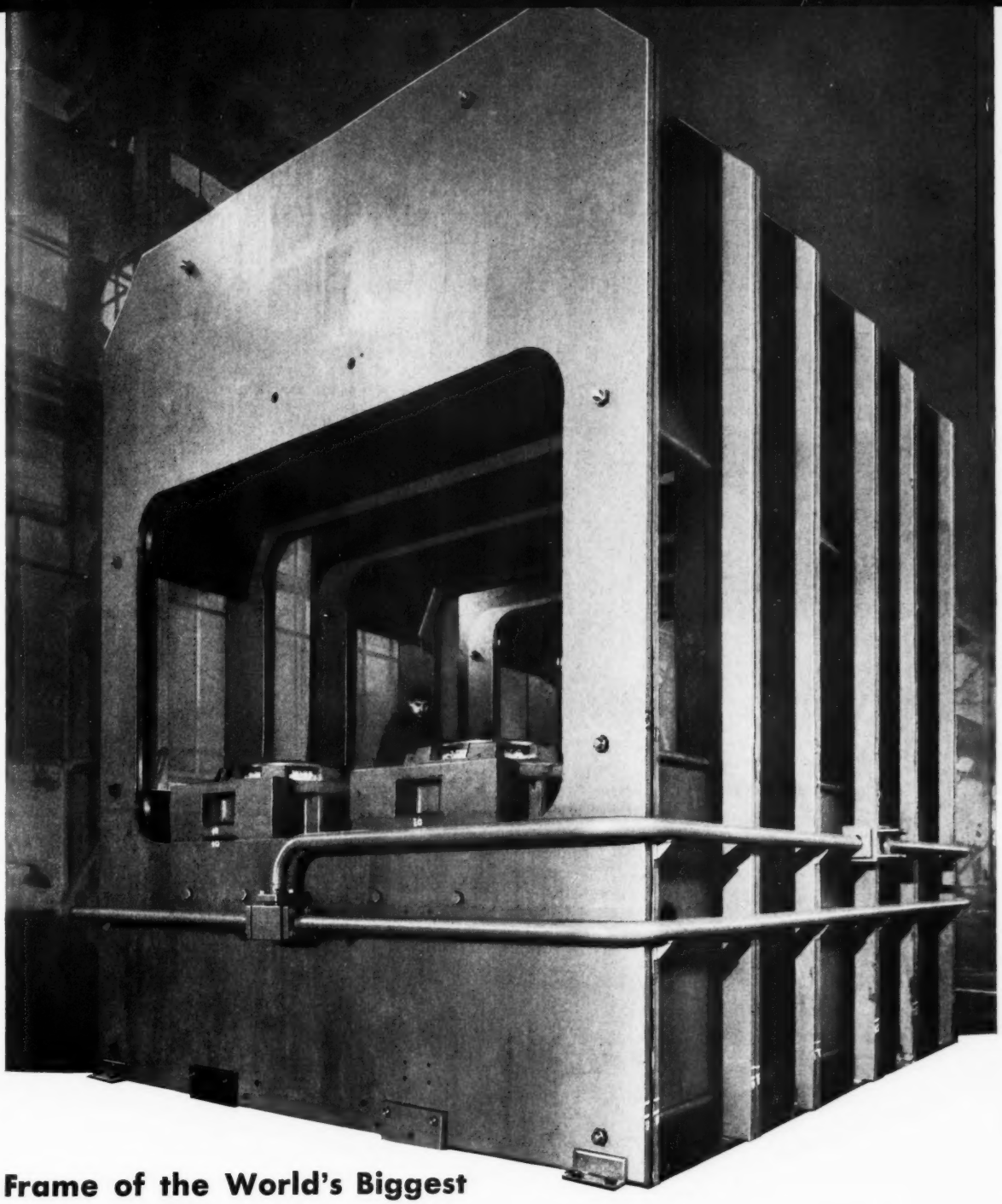
New Adiabatic Plasticizing Extruder

A 2½-inch-diameter-size adiabatic plasticizing extruder that can be used for a wide range of plastic materials has been introduced by Abaco Industries, Inc., Elmhurst, L. I., N. Y. The adiabatic extrusion technique, now gaining popularity, employs a special screw, die restrictions, and up to three times conventional extrusion speed for generating heat in the plastic mass, doubling production, the company says, making localized overheating and thermal degradation almost impossible and providing for a better and more uniform quality product. The Abaco machine can also be run as a conventional plasticizing extruder.

The new extruder is electrically heated, therefore, and can be oil or steam heated as well. It is 75 inches long and 22 inches wide, and its die center is 41 inches high. It has an integrally lined alloy barrel, heavy-duty reduction gear box with in-line silent helical ground gear, is ball-bearing mounted throughout, and possesses an oversize anti-friction thrust

(Continued on page 617)

Abaco 2½-inch adiabatic extruder



Frame of the World's Biggest Conveyor Belt Press

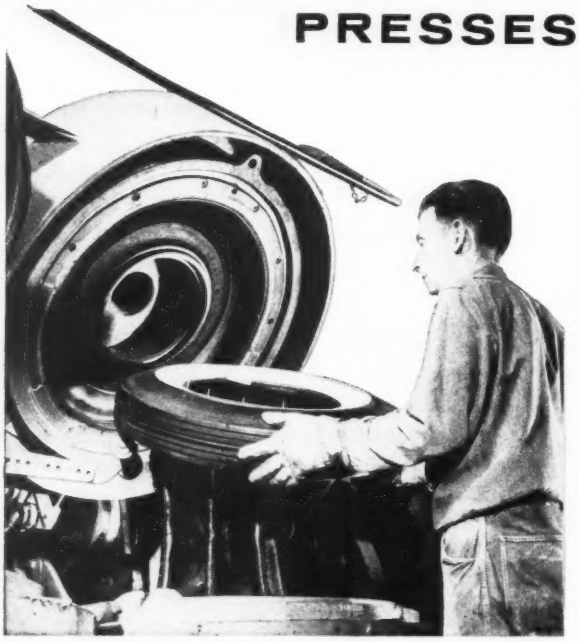
Width of belt 128" · Inside width of frame 146.6"

Siempelkamp

G. Siempelkamp & Co. • Maschinenfabrik, Krefeld, West Germany

Cables: Siempelkampco, Telex No. 0853811, Telephone: 28676

IN BAG-O-MATIC PRESSES



UCON Rubber Lubricants
Trade-Mark

- Give clean break-away
- Increase the life of curing bags
- Improve the quality of the finished tire

because "UCON" LUBRICANTS

- Have no harmful swelling or softening effects on rubber.
- Are less hygroscopic than glycerine.
- Are less volatile than glycerine.
- Are non-alkaline.
- Are non-penetrating.
- Do not crystallize or cause bloom.
- Have high flash points.
- Are made in water-soluble and water-insoluble series.
- Can be mixed with water, alcohols, hydrocarbons, or other solvents; wetting agents; mica; clay.
- Are non-corrosive to metals.
- Are non-irritating to the skin.

ALSO—Check UCON Lubricants as mold-release agents for foam rubber, latex products, and mechanical goods. Write today for complete information.

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Union Carbide and Carbon Corporation
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NEW MATERIALS

Goodyear Cold SBR Oil Masterbatches

Two new non-staining, non-discoloring styrene-butadiene rubbers (SBR) for such applications as white sidewall tires, wringer rolls, hospital sheeting, and shoe soles and heels, as well as for colored floor tile, sporting goods, and toys, have been introduced by the chemical division of The Goodyear Tire & Rubber Co., Akron, O. Designated Plioflex 1773 and Plioflex 1778, both cold oil masterbatches have 23.5% bound styrene, a 50/50 RA/FA emulsifier, a hydroperoxide catalyst, sugar-free iron activator, a carbamate shortstop, and a non-staining type stabilizer, and both polymerize at 41° F. and show a 60% conversion. The two new grades are improvements on former grades 1703 and 1708, respectively, in both color and raw polymer characteristics. Essential difference between the two polymers themselves is the amount of naphthenic oil incorporated in the masterbatches: 25 PPH polymer for Plioflex 1773; 37.5 PPH polymer for Plioflex 1778.

Some physical properties of the rubbers' vulcanizates (original sample) have been reported as follows:

	1773	1778
Specific gravity	1.14	1.14
Tensile strength, psi.	3,500	3,000
Elongation, %	630	585
Hardness, Shore A	58	55
Abrasion resistance, Bu. Stds	204	199

UCC Silicone Rubber K-1035, K-1038

Two new silicone rubber compounds said to have very low compression set, good live steam resistance, and low moisture absorption have been added to the line of the silicones division of Union Carbide & Carbon Corp., New York, N. Y. Designated K-1035 and K-1038, they can be molded, extruded, or calendered and do not require toxic additives. K-1035 has a 50 durometer hardness and a specific gravity of 1.15. K-1038 has a 80 durometer hardness and a specific gravity of 1.40. Both are shipped uncatalyzed, and both are available in neutral or red colors.

Some typical physical properties of the two silicone rubber compounds after a 24-hour cure at 480° F. have been reported as follows:

	K-1035	K-1038
Hardness, Shore A	45	82
Tensile strength, psi.	880	950
Elongation, %	200	80
Tear strength, lbs./in.	40	28
Linear shrinkage, %	6.2	5.5
Specific gravity	1.15	1.42

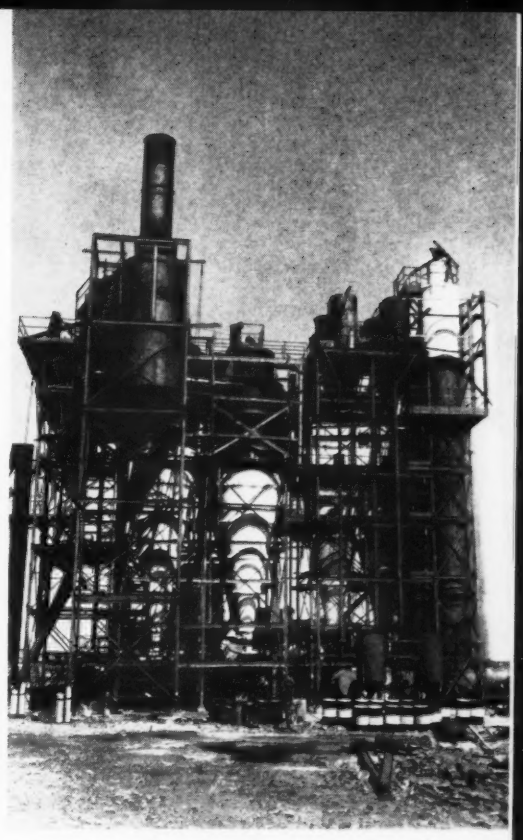
Data sheets may be obtained from the company.

G-E Silicone Rubber Sponge Compounds

Two new silicone rubber compounds designed specifically for the production of expanded unicellular silicone rubber have been announced by the silicone products department of General Electric Co., Waterford, N. Y. Numbered 81597 and 81601, they can be blown and cured to optimum expansion in 10-20 minutes at temperatures as low as 300° F., extruded for free-expansion or mold-expansion processes, and expanded to fill a mold volume and cured in one operation.

G-E says that a feature of these compounds is the flexibility permitted in production operations by the greatly increased time

WITCO-CONTINENTAL DOES IT AGAIN!



New Witco-Continental furnace black facilities at Eunice, New Mexico.

25,000,000 pounds of SRF black per year from new facilities

TO SERVE YOU BETTER... Witco-Continental has further expanded its furnace black production facilities. This photograph shows the just-completed furnaces at our modern plant at Eunice, New Mexico. To meet the increasing needs of the rubber industry, Witco-Continental's carbon black production has been boosted more than 100% over the past 5 years. The new additions to our Eunice plant are now on full stream... to serve you better!

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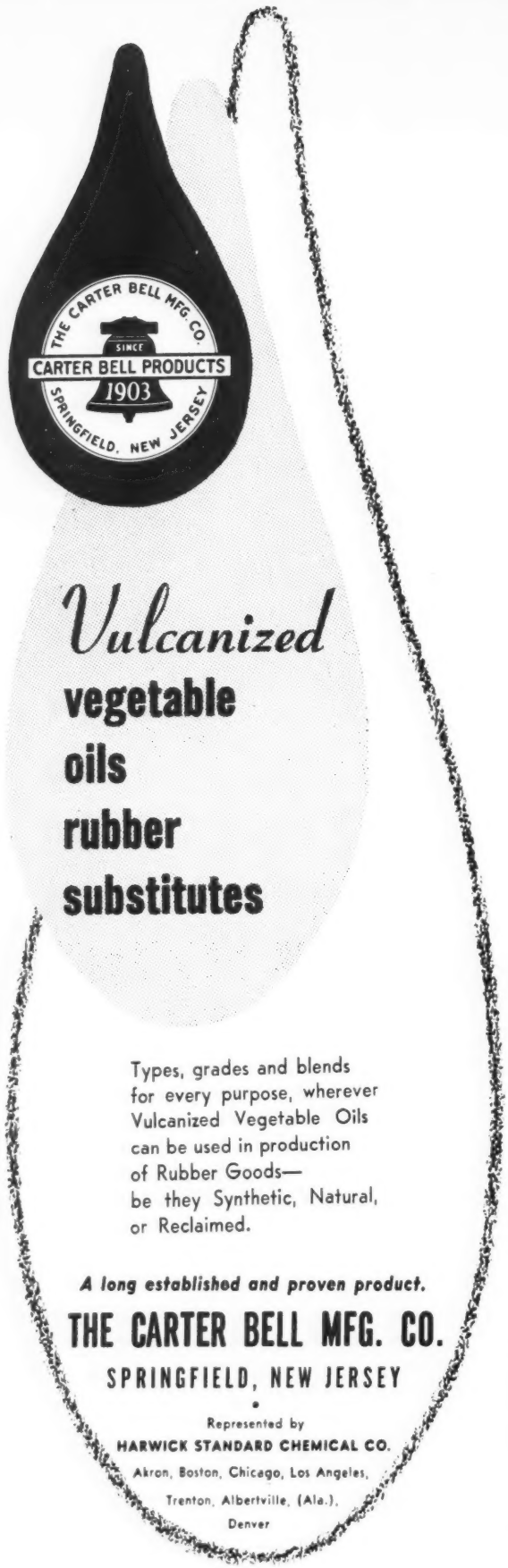

that may elapse between the freshening-forming step and the cure, with little or no resulting loss in expansion. This freshened life is a minimum of eight hours and may be as long as 24 hours. Blowing agent is not supplied with these compounds.

Some reported physical properties of the silicone rubber compounds, when not expanded, but press cured for 10 minutes at 270° F., followed by an oven cure of 24 hours at 300° F., are as follows:

	81597	81601
Hardness, Shore A	45±5	45±5
Tensile strength, psi.	800	800
Elongation, %	250	200

Specific gravity of the uncured 81597 is 1.21-1.24, and its color is white. Specific gravity of the uncured 81601 is 1.17-1.19, and it is neutral in color.

Complete test data on the two materials are available from the company on preliminary product data sheets.

DIBS Delayed-Action Accelerator

A delayed-action accelerator for use in rubber processing where the incorporation of the newer reinforcing furnace blacks, such as SAF, result in higher processing temperatures, is being made available experimentally by American Cyanamid Co., intermediate and rubber chemicals department, Bound Brook, N. J. Called DIBS Accelerator, the material, chemically N,N-diisopropyl benzothiazole-2-sulfenamide, has a melting point of 55-59° C., permitting easy incorporation into the furnace black stocks, the company reports. Storage stability of the accelerator is said to be good.

Data giving the behavior of DIBS in natural rubber-furnace black stocks reveal that DIBS results in more delayed action than NOBS Special, and that the delayed action increases as the accelerator ratio decreases. Other test data, as well as sample natural rubber recipes, are available from the company in a special report.

Stable Casein Solution for Latex Paints

A biologically stable casein solution for use as a prepared stabilizer, thickener, and leveling agent in latex and emulsion paints has been introduced by the chemical division of Borden Co., New York, N. Y. Called Cascoloid ST-50, the 25% casein solution is resistant to spoilage in its natural state and in paint and paper coating formulae, according to the company. Storage life of the stabilizer is said to be unlimited under normal conditions, and it is unharmed by freezing. This material is ready to be added to the pigment grind or to the pigment slip or divided between the two.

A white liquid having 50-53% solids and employing water as a solvent, ST-50 has a pH of 6.8-7.4, a Brookfield viscosity at 20 rpm. of 10,000 to 20,000 cps., and a weight of 9.7 pounds per gallon. It is available in 5-, 30-, and 55-gallon drums.

Sherwin-Williams Azo Red Toners

Two azo red toners for use in the rubber, plastics, and other indutries have been added to the color line of Sherwin-Williams Co., pigment, color, and chemical division, Chicago, Ill. Called Arcturus Red CP 1270, a non-resinated form, and Arcturus Red CP 1275, resinated, they are brilliant yellow-red shades that are said to have exceptional heat stability and display neither migration nor crocking. They have only fair light resistance and show slight bleeding in soap solution. CP 1270 has a specific gravity of 1.63; while that of CP 1275 is 1.50. Oil absorption is 46 and 49, respectively.

•

"Fatty Acids." A. Gross & Co., New York, N. Y. The chemical specifications and components of the company's fatty acids are reported on this chart.

Does chelation actually represent a new kind of chemistry? Are the possibilities as exciting as many seem to think? This series endeavors to answer these—and many other—pertinent questions on this fascinating subject. It is hoped chemists, engineers and purchasing agents alike will find these answers helpful. Now on to . . .

DOW

The Chemistry of Chelation: Part II

Versene and Versenol Series · Descriptions and Uses
A measure of Value · A Suggestion

To review in capsule form: Part I introduced chelation, offered examples of typical chemical reactions, applications, and discussed future possibilities. You will remember that a chelating agent is defined as a chemical which surrounds metallic ions with a multiple-ring structure that keeps the metal chemically inactive and holds it in solution. The applications in industry are many—and new ones are being found almost daily. That, of course, brings us to another consideration: different chelating agents for different uses.

VERSENE® AND VERSENOL®

Chelating agents are commercially available from Dow as 15 different products—all based on aminocarboxylic acid derivatives. Among these, wide spectrum performance is shown by two series of products. The Versene series of products (Versene® 67, Versene 100, Versene Powder, Versene Beads, Versene 9 and Versene Acid) is based on EDTA* and the sodium salts of this material. The Versenol series (Versenol® 120, Versenol Powder and Versenol Beads) consists of various physical forms of Na_3 HEDTA**. The Versene series, except for Fe+++ in the alkaline pH range, is generally the stronger series of the two (more completely chelates the last traces of metal). The Versenol series is notably stronger for Fe+++ in the mildly alkaline pH range and is usually cheaper on a performance basis if the consumer can tolerate the weaker chelate structure. Versene is the strongest, most stable commercially available chelating agent. It is the one with the greatest number of successful applications.

DESCRIPTIONS AND USES

Here are three Dow chelating agents together with their descriptions and uses:

Versene 100 is a concentrated aqueous solution of a technical grade of the tetrasodium salt of EDTA . . . widely used in textile processing, detergent formulations and metal cleaning.

Versene Acid is a dry form of EDTA technical. It is used in many operations as a raw material for the preparation of various derivatives, such as metal chelates, salts (K, NH_4), esters and many others.

Versenol 120 is a concentrated aqueous solution of a technical grade of Na_3 HEDTA. It is also very valuable to detergent, textile and metal-cleaning processes.

Naturally these three specific agents are not the answer to *every* problem. That's the reason for the many other Versene products, to be discussed in Part III.

A MEASURE OF VALUE

A measure of the broad performance capacity of a chelating agent can be obtained from its *chelation value*—determined on a reference metal. Calcium is used as the reference metal under the standard test proceedure accepted by the industry. Dow prefers this "performance basis". It specifies more clearly what chelating agents *actually accomplish* than such terms as "% solids" and "% active". Consequently, the "100" in Versene 100 means that one gram of this product will chelate 100 milligrams of calcium carbonate in accordance with the standard test procedure. By the same token, one gram of Versene 67 will chelate 67 milligrams, and so on.

A SUGGESTION

Two closing thoughts: Dow wants to help in any way possible to further develop the applications for chelation. Also important, Dow would like to hear from *you*—your thoughts, reactions, suggestions. Please inquire about any problems or ideas you may have. Information or actual technical assistance will be forthcoming promptly. Write, on your company letterhead, to Technical Service and Development, Dept. SC 912N-1, THE DOW CHEMICAL COMPANY, Midland, Michigan.

*Ethylenediaminetetra acetic acid

**Trisodium salt of N-hydroxyethylethylenediaminetriacetic acid

THE NEXT TOPIC IN THIS SERIES

PART III
August

Specific chelating agents for specific applications. Polymerization of synthetic rubber (development of Versene® Fe-3 for controlled release of traces of metal used as catalyst—improvement in process that results in Latex stabilization).

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DOW

REDUCE YOUR
plasticizer
COSTS

in low temperature compounds with

ECONOMICAL, EFFICIENT
flexricin®
P-4

Priced under 35¢ per lb., Flexricin P-4 combines low cost with a performance fully equivalent to the more commonly used higher priced plasticizers. By imparting outstanding flexibility at temperatures as low as −80°F, minimum swell in oils and aromatic fuels, marked ozone resistance and excellent recovery on low temperature compression set, Flexricin P-4 is the lowest cost plasticizer that can be *successfully* used in low temperature stocks meeting specifications such as MIL-R-6855. Join the many satisfied users who have found Flexricin P-4 the way to reduce plasticizer costs without sacrificing performance.

For samples and literature of these and other Baker products for the rubber industry, write

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NEW PRODUCTS

Low-Cost Rayon Cord Truck Tire

A rayon cord truck tire "that meets the demands of highway truck operators for a rugged, long-wearing tire at low initial cost" has been placed on the market by The Firestone Tire & Rubber Co., Akron, O. Called Transport A, the tire is designed with a wide, flat five-rib tread, straight shoulder ribs to guard against uneven wear, and a heavy sidewall rib for scuffing protection and uses high-tensile rayon cord.

Rubber Wall Covering

A decorative rubber wall covering in a wide range of colors and patterns has been introduced by R. C. A. Rubber Co., Akron, O., according to The Goodyear Tire & Rubber Co., Akron, O., whose Plioflex styrene rubber and Pliolite S-6B rubber reinforcing resin are the basic raw materials in the new product. Known as Embossed Wall Flex, the covering has a hard surface, is flexible and non-porous, has a fabric backing, and can be applied with conventional rubber adhesives. It is available in either tile or sheet form.

Rubber Electrically Heated Blankets

Rubber electrically heated blankets for a variety of industrial applications have been introduced by United States Rubber Co., New York, N. Y. Called Us-kon blankets, they have a thickness of ⅛-inch and are constructed of two outer layers of non-conductive neoprene sandwiching a paper-thin layer of electrically conductive rubber which is energized by a flat conductor running along two parallel edges of the blanket under the neoprene cover.

The two conductors connect to a lead wire outside the blanket which is plugged into an electrical source. The blankets operate on 115 or 230 volts in almost any wattage, weigh 8-16 ounces per square foot, can reach a temperature of 220° F., and can absorb up to 200 psi. pressure. The blankets can deliver quick, even heat to hard-to-get-at places in industrial equipment or products being fabricated, according to the company.

A wide range of sizes is available.

Riviclor PVC Rigid Pipe

Rigid pipe made from high-strength unplasticized polyvinyl chloride has been introduced by American Hard Rubber Co., New York, N. Y. Trade marked Riviclor, the pipe is said to be unusually resistant to chemicals, weather and aging, electrolytic corrosion, fungus, and bacteria. Its impact strength is reported as 2.5 (Izod), and this pipe remains tough and non-brittle at subzero temperatures, according to the company.

Suggested uses are for food and beverage equipment, in underground industrial pipe lines, in hazardous electrical locations, and for the handling of many corrosive chemicals.

Riviclor pipe and fittings are available from a size of ½-inch to two inches, in standard or extra-heavy wall construction. Working pressure of the ½-inch extra-heavy pipe is 490 psi.;

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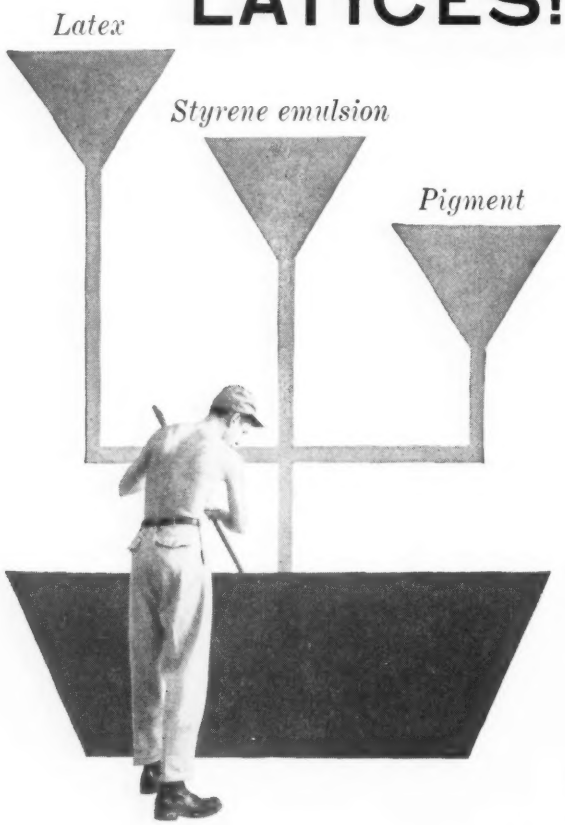


No extra mixing step when you use Monsanto's styrene emulsions

Compounding is simplified when you modify synthetic or natural rubber latices with Monsanto's specially formulated styrene emulsions. The fine particle size allows combination of the emulsion with the latex when pigments and fillers are added. No extra mixing step is required.

Pre-selected ratios can be controlled exactly—from high-rubber low-styrene to low-rubber high-styrene. Recommended for modifying flexibility characteristics of latex compounds used in manufacturing baby pants, girdles, surgical gloves, upholstery fabrics, rug underlays, adhesives, raincoats, foam rubber and many other products.

Prices and supplies of Monsanto's styrene emulsions are stable. Write today for data sheets and laboratory samples. Monsanto Chemical Company, Plastics Division, Room 935, Springfield 2, Mass.

MONSANTO

while that of the two-inch extra-heavy pipe is 255 psi., calculated at 70° F. The pipe is said to retain rigidity up to 160° F. under most conditions.

Riviclor diaphragm valves are also being offered.

Goodrich Agatine Floor Tile

A resilient floor tile with a multicolored agate-like design is being marketed by The B. F. Goodrich Co., flooring division, Watertown, Mass. Dubbed Agatine, the tile "provides the quiet and comfort of rubber with a super-dense surface eliminating dirt-catching surface pores." The design extends through the thickness of the product.

This tile is available in a variety of colors in standard nine-inch squares, in ⅛-inch thickness for heavy traffic areas, and in 80-gage for lighter traffic areas.

Parker O-Ring Lubricant

A lubricant that is said to extend the service life of synthetic rubber O-rings has been introduced by Parker Appliance Co., Cleveland, O. Dubbed O-Lube, it is especially recommended for low-pressure pneumatic and vacuum systems. The grease is applied to both the O-ring and the metal surfaces over which the O-ring must slide. After original assembly lubrication, additional application in pneumatic systems is not normally necessary, the company says.

The new lubricant is available in four-ounce tubes.

Rubber of 5 Durometer Hardness

A super-soft, non-porous rubber that can be bonded to metal and other materials and used in temperatures up to 200° F. has been introduced by Roth Rubber Co., Chicago, Ill. Called compound RRD-992, the rubber has a 5 durometer hardness and is believed to be the softest solid rubber developed by the industry. The rubber is available in sheets or strips up to one inch thick.

Suggested applications include vibration absorption, noise dampening, replacement for sponge material, as a shock mount, a watertight seal, and as an insulator. The company will also mold or bond it to metal upon specification.

Goodyear Heat-Shrinking Pliofilm

A new packaging Pliofilm that shrinks about 18%, when heat is applied, has been developed by the packaging films department of The Goodyear Tire & Rubber Co., Akron, O. Dubbed 75ST Shrink Tite, the Pliofilm, a waterproof rubber chloride composition, is said to be ideally suited to the packaging of such foods as luncheon meat and cheese where a skin-tight package is required.

The new Pliofilm can be used on automatic or semi-automatic overwrap equipment and is available in either cut-to-size sheets or in rolls.

Rubber Waders, Wading Shoes

All-rubber coveralls and all-rubber wading shoes for stream and surf fishermen are being made available by So-Lo Marx Rubber Co., Loveland, O. Dubbed Chest Hi-"totes", the coveralls are made entirely of latex rubber, weigh about two pounds, compared with rubberized-fabric waders which weigh 10-12 pounds, are of seamless construction, and have suspender straps made of elastic nylon and adjustable chrome buckles.

The wading shoes are called Wading Shoe-"totes" and are also made of latex rubber, but are strengthened by neoprene-coated and rubber-cord construction around the sides, toe, and heel and have neoprene heels and soles, the latter of textured crepe neoprene. Both coveralls and wading shoes float in water.

TECHNICAL BOOKS

BOOK REVIEWS

"The Petroleum Acids and Bases." H. L. Lochte and E. R. Littmann. Chemical Publishing Co., Inc., New York, N. Y. Cloth cover, 5½ by 8¾ inches, 308 pages. Price, $9.

This text, called the first book in the English language on naphthenic acids and the first in any language on the basic petroleum nitrogen compounds, gives a detailed account of the occurrence, isolation, and identification of the known petroleum acids and bases. Research done in this field, both in the United States and abroad, has been carefully documented, and from the relative paucity of such research it would seem that much more pioneering work will be done in the years ahead, especially in view of the recent growth of the petrochemicals industry.

This text is illustrated with many flow sheets of processes as an aid to petroleum chemists and engineers, and to manufacturers and users of the naphthenic acids and their derivatives, the only class of compounds in the field of petroleum acids and bases that has so far found extensive industrial application.

Dr. Lochte, Professor of Chemistry at the University of Texas, and Dr. Littmann, associated with Enjay Co., competently cover both the theoretical and empirical aspects of the subject.

"An Encyclopedia of the Chemical Process Industries." J. R. Stewart. Chemical Publishing Co., Inc., New York, N. Y. Cloth cover, 6 by 9 inches, 820 pages. Price, $12.

Alphabetically arranged here are facts on the chemical process industries, including the raw materials, processes, and equipment used and the products manufactured. Definitions of technical and scientific terms which are frequently met in these industries are also listed, as well as trade names of products and their producers. Properties and specifications of many chemical materials are given. The book has had four previous editions published under the title, "Stewart's Scientific Dictionary." The last edition was published in 1953.

"British Plastics Year Book, 1956." Twenty-sixth Edition. Iliffe & Sons, Ltd., London, England. Cloth, 9¼ by 6¼ inches, 740 pages. Price, $5.90.

This classified guide to plastics products and manufacturers in the United Kingdom contains nine tabbed sections, each revised from the 1955 edition. A general section includes a review of recent patents, new companies registered in 1955, and specifications. A materials section lists raw materials and the companies producing them. A products section gives an account of available molded and fabricated plastics goods and their manufacturers. A plant and equipment section provides a rundown of engineering and chemical equipment available. A glossary section alphabetizes proprietary names and technical terms. An address section consists of the names and addresses of UK and overseas firms, technical organizations, consultants, and periodicals. A who's who section, one on associations and federations, and another on technical data, conclude the book.

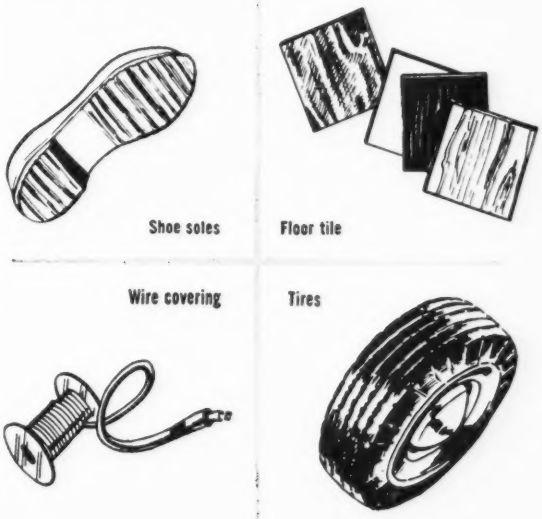
NEW PUBLICATIONS

"Industrial Kaleidoscope Digest." Rubber & Technical Press, Ltd., London, England. Price, $5 annually. This is a British monthly digest for industrial executives of news and technical developments in a wide range of industries, including rubber, plastics, textile, and electronic. Previously published by the duplicating process, it is now being type-set.

PANAREZ

HYDROCARBON RESINS

improve products like these:



If you compound rubber it will pay you to investigate *low cost* PANAREZ hydrocarbon resins. These softeners are available in any color from Barrett No. 1 to 18, and softening point from 40° F to 300° F. They are supplied in flaked or solid form.

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PANAPOL Hydrocarbon drying oils

PANASOL Aromatic solvents

"Polyurethanes—A Versatile Synthetic for a Dynamic Era." A report written by a group of students at the Harvard University Graduate School of Business Administration. 124 pages, including appendices. Polyurethane Associates, P. O. Box 98, Cambridge 38, Mass. Price, $10. This report is an integrated analysis of the various aspects of polyurethanes, including technical, production, and marketing information. Developments to date are reviewed, and estimates of capitalization necessary to enter particular phases of the industry are given, together with selling prices, market potential, and profitability. The indices contain lists of firms contacted, isocyanate manufacturers, polyester resin manufacturers, prepolymer and in-place foam resin suppliers, foam machinery manufacturers and suppliers, urethane foam manufacturers, companies active in urethane rubber development, and companies active in urethane adhesives and coatings.

"Sartorius' Balances." C. A. Brinkmann & Co., Great Neck, L. I., N. Y. 4 pages. European-made balances, as well as refractometers, pH meters and controllers, microscopes, and photomicrographic equipment, all distributed by Brinkmann, are described and pictured in this bulletin. Sales brochures describing these instruments in greater detail are also available from the company.

"Hycar American Rubber Technical Newsletter." Vol. IV. B. F. Goodrich Chemical Co., Cleveland, O. 44 pages. This annually published technical data booklet on Hycar polymers contains a variety of information on compounding, properties, and uses and includes a softener study with Hycar 1042.

"Easily Inflatable Neoprene Balloons." J. C. Carl and T. E. Betchel. Report BL-314. E. I. du Pont de Nemours & Co., Inc., elastomers division, Wilmington, Del. 4 pages. A recipe for neoprene latex toy balloons said to be as soft and easy to inflate as natural rubber balloons appears in this technical report.

"Rotary Joints for Vapor-Liquid-Gas." Bulletin 14. Sealol Corp., Providence, R. I. 4 pages. The company's rotary joints for conveying steam, vapor, or liquids under pressure between stationary and revolving units are described and illustrated in this folder.

"Plastisol Molding." Watson-Standard Co., Pittsburgh, Pa. 4 pages. The methods and applications of plastisol dip molding, slush molding, rotational molding, and low-pressure injection molding are dealt with in this article reprint.

"An Adventure in Profits." Mobay Chemical Co., St. Louis, Mo. 20 pages. The company's flexible urethane foam and its uses are discussed in this illustrated brochure, with a view to stimulating the interest of manufacturers.

"Supervisors Safety Manual." National Safety Council, Chicago, Ill. 354 pages. Price, $3.25 to members of the NSC. This comprehensive guide to all phases of industrial safety includes such subjects as first aid, protective equipment, materials handling, machine guarding, portable power tools, and fire prevention.

"Air Hose Couplings, Hose Clamps, Hose Nipples, Valves, and Manifolds." Bulletin No. 110. Le-Hi Division, Hose Accessories Co., Philadelphia, Pa. 8 pages. This is an illustrated catalog of the firm's steel, malleable iron, and bronze air hose accessories.

"Cellobond Rubber Reinforcing Resins." Bulletin No. KI British Resin Products, Ltd., London, England. 27 pages. The company's resin reinforcing agents for natural and nitrile rubbers are described in this bulletin. Test data, sample recipes, and compounding information are given.

"The AMA Management Course." American Management Association, New York, N. Y. 46 pages. The AMA management course, consisting of four one-week units of instruction in the basic principles, skills, and tools of management, is covered in this illustrated booklet. The course is given throughout the year.

Publications of Taylor, Stiles & Co., Riegelsville, N. J.:

"General-Purpose Cutters." Index No. App. 212. 4 pages. Some of the firm's precision-type cutters, designed for accurate length of cut, are pictured and described in this folder. They are for use with thin sheets of rubber, plastics, etc.

"Dicing Cutter or Pelletizers." Index No. App. 213. 4 pages. Specifications of the company's Series 100, 200, and 700 dicing cutters or pelletizers for plastics are given in this illustrated folder.

"Basic Studies on the Chemistry of Fluorine Compounds." PB 111959. Office of Technical Services, United States Department of Commerce, Washington, D. C. 148 pages. Price, $3.75. This is a final report of research conducted at Cornell University on fluorine compounds under the U. S. Army's Arctic rubber program. Purpose of the research was to investigate fundamental problems directed toward new methods of synthesis of potentially polymerizable fluorine-containing monomers and related work aimed at obtaining a better understanding of the basic chemistry of organic fluorine compounds.

"Detero Wax Beads." The C. P. Hall Co., Akron, O. The physical properties of the company-distributed wax beads for rubber and plastics compounding are assembled in this chart, and specific recommendations made for their use. The beads are produced by Arrow Laboratories, Chicago, Ill.

"Dresinol Resin Dispersions." Hercules Powder Co., Wilmington, Del. 16 pages. The company's dispersions for modifying SBR, neoprene, natural rubber, and polyvinyl acetate are described in this booklet. Dresinol is a series of 40-45% solids, solvent-free, aqueous dispersions of rosin-derived resins.

"pH and Conductivity Recorders and Controllers." Catalog 1551. Minneapolis-Honeywell Regulator Co., industrial division, Philadelphia, Pa. 20 pages. The company's equipment for measuring, indicating, recording, and controlling pH, Redox, and conductivity are pictured and described in this catalog.

"The Separation and Characterization of Graft Copolymers from Natural Rubber." F. M. Merrett. Publication No. 224. The British Rubber Producers' Research Association, Welwyn Garden City, Herts., England. 12 pages. Graft copolymers formed by polymerizing vinyl monomers in the presence of natural rubber were studied. These graft copolymers follow a general pattern where one of the constituents can be insolubilized, while the other remains soluble; the compound forms a stable sol which is largely unaffected by heat or ionic materials at suitable ratios of solvent to precipitant.

"Use of G-E Silicones Mold Release Agents in Rubber Manufacturing." AD 9-A. General Electric Co., Waterford, N. Y. 7 pages. The application of the company's mold release agents in the manufacture of tires, mechanical rubber goods, flooring, mandrels, and surface finishing is outlined in this publication.

"Materials in Motion . . . by National." National Vulcanized Fibre Co., Wilmington, Del. This illustrated booklet treats of the company's lightweight vulcanized fibre containers as applied to materials handling.

"Permanent Non-Electric Magnetic Drums." Bulletin B54-1. Eriez Mfg. Co., Erie, Pa. 4 pages. The company's magnetic drums for separating unwanted iron from rubber, chemicals, plastics, and other materials are described in this illustrated brochure.

"Catalog Binder Index." Fischer & Porter Co., Hatboro, Pa. 4 pages. This index lists all of the company's available catalogs describing its instruments for measuring flow, pressure, temperature, liquid level, density, viscosity, and other factors.

"Dry Processing Equipment." Sturtevant Mill Co., Boston, Mass. 8 pages. The firm's dry processing equipment for a variety of industries is described and illustrated in this brochure.

Publications of Dow Corning Corp., Midland, Mich.:

"Silastic Facts." Reference 9-367. 2 pages. The properties and applications of Silastic 6526, an extreme-temperature, low compression set silicone rubber stock, are contained on these data sheets.

"Silastic Facts." Reference 9-368. 4 pages. This is an index to Silastic stocks and typical properties of parts fabricated from them.

"Hydrogen Peroxide Safety." Solvay Process Division, Allied Chemical & Dye Corp., New York, N. Y. This wall chart outlines the safety rules to be followed in handling hydrogen peroxide.

"Acetophenone." Technical bulletin F-6970A. Carbide & Carbon Chemicals Co., New York, N. Y. 8 pages. The properties, specifications, solubilities, and applications of the firm's acetophenone are reported on these data sheets.

"Process Equipment." Dravo Corp., Pittsburgh, Pa. 4 pages. The company's large-scale and special-purpose process equipment for the rubber, plastic, chemical, and textile industries is described in this illustrated brochure.

"Universal Clamp." Manostat Corp., New York, N. Y. 4 pages. The company's clamp devices for providing secure mounting of set-ups and pilot-plant apparatus are described and illustrated.

"The Story of Science in Industry." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 32 pages. The inter-relation of scientific principles and discoveries, industry, and the consumer is dicussed and documented in this extensively illustrated booklet.

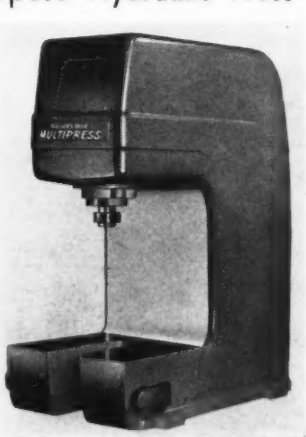
New Extruder

(*Continued from page 606*)

bearing. It features a separate dust-proof control cabinet with four or six electronic pyrometer controls for heat regulation and is accessible from front or back. The hard alloy screw is hollowed for cooling. The machine is powered by a U.S. Varidrive starter of 7/1 ratio producing 15-95 or 25-175 rpm. for adiabatic extrusion. There is an ammeter for constant current input reading.

One-Ton Multi-Purpose Hydraulic Press

A one-ton multi-purpose hydraulic press with ram pressures ranging from 500 to 2,000 pounds has been placed on the market by Denison Engineering Co., Columbus, O. Called Denison Multipress, it is, according to the company, designed for such operations as assembling, riveting, punching, marking, trimming, pelleting, compacting, broaching, and other industrial uses.



Denison Multipress

The press weighs 225 pounds, is 22 inches high, has a three-inch stroke, a 1.13-inch diameter ram, and a ¾-hp. motor that operates on a 110-volt, 60-cycle single-phase circuit. Other features include a vane-type pump with two discharge ports, interlocked manual controls, and a relief valve used to adjust maximum pressure in the hydraulic system. The unit can be operated manually or in a production line.

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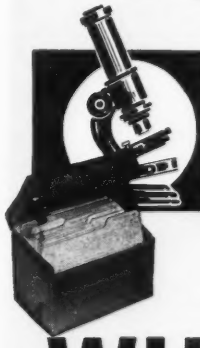

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MARKET REVIEWS

Natural Rubber

Natural rubber prices continued to fall during the first half of the May 16-June 15 period, but recovered substantially in the last half to offset the losses sustained over the period. On the spot market the #1 grade dropped to 27.13¢ a pound on May 31, the lowest price recorded for it since October 13, 1954, then rose sharply to 30.88¢ by June 15. Trading on the New York Commodity Exchange was again below normal during the period; a total of 43,050 tons of R.S.S. 1 was sold.

Contributing to the initial decline of prices during the period were further cutbacks in U. S. automotive production and an accompanying slack in automotive sales, a cut in the export price of American synthetic rubber, the rescinding of an advance in the cost to the American consumer of domestic synthetic rubber, reports of continuing heavy stocks of natural rubber in the Far East, and President Eisenhower's illness.

Prompting the upward trend during the first half of June were such factors as Malayan labor troubles, the lifting of Indonesia's ban on rubber shipments to Red China, probable speculative activities on the London and Singapore markets, and a general feeling on the part of buyers that the bottom of the market may have been reached, and this was an opportune time to replenish sagging stocks.

It may be true, as some of the more optimistic in the natural rubber industry believe, that natural rubber prices will not in the near future fall below the level of May 31, but there are few around to predict that more than a small part of the dizzying loss sustained over the last few months can be made up. The end of the automotive recession is not in sight, and synthetic rubber output still continues to break records, two factors contributing to lower natural prices.

COMMODITY EXCHANGE
WEEK-END CLOSING PRICES

Futures	May 18	May 25	June 1	June 8	June 15
May	29.15	27.30	——	——	——
July	29.40	27.25	26.15	30.10	30.35
Sept.	28.70	26.55	25.45	27.65	28.20
Dec.	28.20	25.90	24.80	26.80	27.05
Total weekly sales, tons	11,620	8,590	7,170	10,030	11,190

Statistically, sales on the New York Commodity Exchange for the second half of May were 21,680 tons, bringing the monthly total to 38,890 tons, the lowest figure in the past 12 months. Sales during the first half of June were 22,370 tons, signs of an upswing. Near-May stocks began the period at 30.10¢ a pound for the #1 grade and swung around a hairpin curve to 30.35¢ on June 15. There were 22 trading days during the period.

On the physical market, average May monthly spot prices for representative grades were as follows: R.S.S. #1, 29.96¢; R.S.S. #3, 29.68¢; #3 Amber Blankets, 26.34¢; and Flat Bark, 20.71¢. There were 22 trading days during May. For the first half of June, R.S.S. #1 averaged 29.48¢.

NEW YORK SPOT MARKET
WEEK-END CLOSING PRICES

	May 18	May 25	June 1	June 8	June 15
R.S.S.:					
#1	30.63	28.63	27.25	30.38	30.88
#2	30.50	28.50	27.00	30.25	30.63
#3	30.38	28.38	26.75	30.13	30.38
Latex Crepe					
#1 Thick	36.25	34.75	32.75	35.63	36.50
Thin	36.25	34.75	32.75	35.63	36.50
#3 Amber Blankets	26.63	24.63	22.75	23.38	23.38
Thin Brown Crepe	26.25	24.25	22.50	23.13	23.13
Flat Bark	20.88	19.38	18.13	18.75	18.25

Synthetic Rubber

The recent price increases of general-purpose type synthetic rubber were, in effect, rescinded during June as natural rubber plummeted to its lowest price in almost two years. The initiative was taken on June 1 by Goodrich-Gulf, which lowered its general-purpose grades from 23.9¢ a pound to 23¢, f.o.b. Goodyear followed two weeks later, dropping its Plioflex 0.15¢ a pound to 24.1¢ in quantities of 60,000 pounds or more. Immediately afterward, Phillips Chemical announced it was cutting its Philprene from 24.25¢ a pound to 24.1¢, minimum carload transportation allowed.

As of this writing, indications are strong that natural rubber prices are again on the upsweep. Between June 1 and June 22, R.S.S. #1 rose 5¢ a pound on the spot market, from 27.25¢ to 32.25¢. However, another increase in synthetic rubber prices is not expected too soon. Since synthetic rubber is considered a chemical rather than a commodity, it is not subject to supply-and-demand influences. If demand falls off, the synthetic plants, until recently running well over rated capacity, can still be operated profitably at 75 to 80% of capacity. It is believed that this is the current picture of the industry. The considerable cutback in automotive production this year has forced synthetic rubber producers to reappraise their production schedules.

An April-May statistical report by The Rubber Manufacturers Association, Inc., shows that the fall in natural rubber prices has somewhat helped the commodity in its struggle with the synthetic product. In April, new rubber consumption was given as 73,691 tons, of which natural totaled 46,961 tons. In May, new rubber consumption was reported at 74,561 tons, of which natural accounted for 47,991 tons. Percentage-wise, synthetic fell from 61.08% to 60.84% of the total during the two months.

The Natural Rubber Bureau has revised its estimate of total new rubber consumed during 1956, based on an automotive production cut of 24% over last year's output. NRB's original estimate of 1,500,000 tons has been reduced to 1,415,000 tons, with the natural product accounting for 550,000 tons and synthetic 865,000 tons.

Latex

The price of *Hevea* latex continued to fall during the May 16-June 15 period as stocks in the Far East, as abundant as they have been in the past several months, went begging for takers. Most buying was believed to be in the more forward positions. Observers think, however, the situation is likely to improve in the near future. Latex production will certainly be cut by the effects of labor difficulties in the Straits, by wintering, and by voluntary curtailment plans plantations are putting into effect. Also, automotive production in the United States is expected to improve.

Purchasing of American synthetic latices was also reported to have lagged during the period. Stocks were thought to be adequate.

Prices for ASTM Centrifuged Concentrated natural latex, in tankcar quantities, f.o.b. rail tankcars, ranged during the period from 34 to 39¢ per pound solids. Prices of synthetic latices remained the same, being quoted as SBR, 26-32.3¢; neoprene, 37-47¢; and N-type, 46-54¢.

Final March and preliminary April domestic statistics for all latices were reported by the United States Department of Commerce as follows:

(All Figures in Long Tons, Dry Weight)

Type of Latex	Production	Imports	Consumption	Month-End Stocks
Natural				
Mar.	0	7,800	6,438	18,309
Apr.	0	—	5,450	21,077
SBR				
Mar.	5,869	42	5,888	6,867
Apr.	6,066	—	4,726	7,199
Neoprene				
Mar.	782	0	729	1,097
Apr.	969	0	699	1,071
Nitrile				
Mar.	1,158	0	781	2,340
Apr.	866	0	475	1,695

Reclaimed Rubber

The reclaimed rubber market continued slow during the period from May 16 to June 15 as automotive production, keyed

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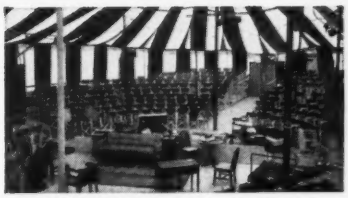
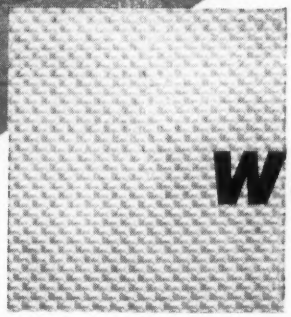


Coater: H. M. Sawyer & Son Co., Watertown, Mass. *Fabricator:* Hoosier Tarpaulin Co. of Indianapolis.

The theater tent shown here is something special. It's the Tucson Winter Playhouse, first multi-colored vinyl coated nylon tent in the U. S. Its red-and-white striped top is made with Welkote, the Wellington Sears nylon base fabric which, when properly coated and fabricated, combines lightness and handling ease with unusually high tear-resistance, strength, resistance to oil, rot and mildew. This rugged filament nylon fabric has become the base fabric specified by coaters for tarpaulins, truck covers, and protective coverings for industrial, agricultural and marine uses. Specifically engineered for vinyl and neoprene coating, it is available on a continuous-supply basis, in three basic weights and a wide range of widths. It is backed by the experience of Wellington Sears, with a deep understanding of the special needs of the coating industry, and over a century of serving the fabric needs of all industries. This experience is yours to rely on and work with in all our fabrics, whether you specify Welkote or any one of an unequalled number of base fabrics available for every coating use at Wellington Sears. For further information on Welkote, write Dept. H7.



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to sales, maintained its lower levels. Observers had predicted a pick-up in automotive sales during May and June, but this did not happen. Orders for reclaimed rubber were said to be sparse, leading to the belief that the slump in the industry will continue, at least until the end of July.

No changes occurred in reclaimed rubber prices during the period.

RECLAIMED RUBBER PRICES

	Lb.
Whole tire: first line	$0.105
Fourth line	.0925
Inner tube: black	.15
Red	.21
Butyl	.15
Pure gum, light colored	.23
Mechanical, light colored	.135

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Scrap Rubber

Quiet trading prevailed on the scrap rubber market during the period from May 16 to June 15, causing prices of most grades to decline up to $2 a ton. Observers predicted that the price drop would continue well into July. The fall in automotive production and the g neral slackening in industrial output during the hot weather were believed to have caused the disinterested market.

Scrap rubber imports during February amounted to 2,847,574 pounds, worth $149,137, compared with the 2,183,163 pounds, valued at $135,818, imported during January, according to the Bureau of the Census, U. S. Department of Commerce. Export figures were not yet available.

Period-end buying prices for scrap rubber grades follow:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$14.00/15.50	$15.50
S.A.G. auto tires	Nom.	Nom.
Truck tires	14.00	17.00
Peelings, No. 1	40.00	40.00
2	23.00	25.00
3	16.00	19.00
Tire buffing	13.00	Nom.
	(¢ per Lb.)	
Auto tubes, mixed	2.75	2.75
Black	5.50	5.50
Butyl	Nom.	Nom.
Red	6.50	6.50

Cotton Fabrics

Rather slow trading characterized the industrial fabrics market during the period from May 16 to June 15. Users of various types of industrial fabrics were buying as closely as possible to meet immediate operating needs, with trading, as a result, limited to small- and moderate-size yardages for spot and nearby shipment.

This generally prevailing pattern of buying was evident in wide goods such as drills and sateens for plastic coating purposes, in Army ducks, and in numbered Grade B ducks for waterproofing uses.

Mill-order backlogs in many cases were down to very low levels, and operations were proceeding on a week-to-week basis to fill rush orders of customers. Some leading mills, however, had orders which extended into the third quarter.

Drops of 1¢ a yard were recorded at period-end for 59-inch, 1.85 yd. drills; 53-inch, 1.32-yd. sateens; and 58-inch, 1.21-yd. sateens. There were fractional decreases in some other items.

COTTON FABRICS

Drills		
59-inch 1.85 yd.	*yd.*	$0.38
2.25-yd.		.33
Ducks		
38-inch 1.78-yd. S.F.	*yd.*	nom.
2.00-yd. D.F.		.34
51.5-inch, 1.35-yd. S.F.		.4963
Hose and belting		.69
Osnaburgs		
40-inch 2.11-yd.	*yd.*	.26
3.65-yd.		.165
Raincoat Fabrics		
Printcloth, 38½-inch, 64x60, 5.35-yd.	*yd.*	.15
6.25 yd.		.1275
Sheeting, 48-inch, 4.17-yd.		.20
52-inch, 3.85-yd.		.24
Chafer Fabrics		
14.40-oz./sq. yd. Pl.	*yd.*	.70
11.65-oz./sq. yd. S.		.61
10.80-oz./sq. yd. S.		.6575
8.9-oz./sq. yd. S.		.67
Other Fabrics		
Headlining, 59-inch, 1.65-yd., 2-ply	*yd.*	.465
64-inch, 1.25-yd., 2-ply		.595
Sateens, 53-inch, 1.32-yd.		.5575
58-inch, 1.21-yd.		.61
Tire Cord		
1242 Standard	*lb.*	.83

Rayon

Total calculated production of rayon and acetate yarn during May was 63,700,000 pounds, of which 31,300,000 pounds were regular-tenacity yarn, and 32,400,000 pounds were rayon high-tenacity yarn. April production had been: total, 64,500,000 pounds; regular-tenacity, 30,300,000 pounds; and high-tenacity, 34,200,000 pounds.

Total domestic shipments for May were 56,900,000 pounds, consisting of 27,800,000 pounds of regular-tenacity yarn and 29,100,000 pounds of high-tenacity rayon yarn. April shipments had been: total, 58,100,000 pounds; regular-tenacity, 27,100,000 pounds; and high-tenacity, 31,000,000 pounds.

Total end-of-May stocks were 61,000,000 pounds, of which 48,100,000 pounds were regular-tenacity yarn, and 12,900,000 pounds were high-tenacity rayon yarn. End-of-April stocks had been: total, 55,000,000 pounds; regular-tenacity, 45,200,000 pounds; and high-tenacity, 9,800,000 pounds.

Rayon tire yarn producers reported no new price cuts during the period. The current price range of tire yarns and fabrics is given below.

RAYON PRICES

Tire Yarns	
High-Tenacity	
1100/ 480	$0.62/$0.67
1100/ 490	.62/ .67
1150/ 490	.67
1165/ 480	.68
1230/ 490	.67
1650/ 720	.58/ .64
1650/ 980	.58/ .64
1875/ 980	.64
2200/ 960	.58/ .63
2200/ 980	.58/ .63
2200/1466	.67
4400/2934	.63
Super-High-Tenacity	
1650/ 720	.63/ .69
1900/ 720	.69
Tire Fabrics	
1100/490/2	.77
1650/980/2	.725
2200/980/2	.715

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Malaya

(*Continued from page 603*)

The equipment imparts a positive electric charge to the dust particles before they are blown upon the rubber tree. Since trees are negatively charged, the insecticide is attracted to the tree with a minimum of loss. The similar electric charge on the particles of insecticide also causes the dust to become well distributed because the particles will not cling to each other.

Marketed by Agricola Plant Protecting Chemical, Ltd., London, England, the equipment consists of an electric generator, a dust blower, and a small gasoline engine to supply the power. The unit is portable.

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Israel

A substitute for stearic acid as an activator in rubber vulcanization is being marketed by Kadimah Chemical Corp., P.O. Box 345, Haifa. According to a report by the Rubber Research Association, Ltd., of Ir Ganim, the product, called "Kadimic" Acid, is produced by oxidation of a gas-oil pertoleum fraction, yielding a mixture of fatty acids and esters. Physically, "Kadimic" Acid is a brown colored liquid of pronounced odor having a specific gravity of 0.954, a Brookfield viscosity of 325 poises of 15° C., and containing 15-25% non-saponifiables.

The product was found to give cures slightly higher peaks than with stearic acid. One PPH rubber gives good activation, but addition of up to three parts influences the mechanical properties of the rubber only very slightly. In a clay-loaded compound, the effect of additions up to 3 PPH rubber is accompanied by a smaller decrease in tensile properties than parallel additions of stearic acid, perhaps because "Kadimic" Acid improved dispersion of the clay, the Association says.

"Kadimic" is claimed to be a very effective softener and is dissolved rapidly in the mix, which retains its tack for considerable periods. No adverse effect on the aging of rubber compounds was seen.

Philprene*

wants to help with your rubber problems

Maybe you have used rubber compounds for years, or perhaps you're a comparative newcomer in the field. In either case, our laboratory and plant studies of various rubber compounds... their characteristics, advantages, behavior under different temperatures and varying conditions . . . can be of benefit to you.

In addition, our technical representative will be glad to help with your special rubber problems. Phillips practical experience with rubber, backed by the latest laboratory research and testing techniques, can help you use PHILPRENE more efficiently . . . and therefore more profitably. This service is free, of course.

*A Trademark

Phillips 66

CURRENT PHILPRENE RUBBERS

	POLYMERS	MASTERBATCHES
HOT	PHILPRENE 1000 PHILPRENE 1001 PHILPRENE 1006 PHILPRENE 1009 PHILPRENE 1018 PHILPRENE 1019	
COLD	PHILPRENE 1500 PHILPRENE 1502 PHILPRENE 1503	PHILPRENE 1601 PHILPRENE 1605 Philblack® A cold rubber masterbatch
COLD OIL	PHILPRENE 1703 PHILPRENE 1706 PHILPRENE 1708 PHILPRENE 1712	PHILPRENE 1803 similar to GR-S 1801 but incorporating 25 parts Philrich® 5

NOTE: PHILPRENE 1019 AND 1503 ARE ESPECIALLY DESIGNED FOR THE WIRE AND CABLE INDUSTRY

PHILLIPS CHEMICAL COMPANY

Rubber Chemicals Division
318 Water Street, Akron 8, Ohio

Synthetic Rubbers and Latices*

Acrylic Types

Hycar 4021	$1.35[c]
4501	.81[c]

Fluorocarbon Types

Kel-F Elastomer *lb.*	15.00 / 16.00

Isobutylene Types

Enjay Butyl 035, 150, 215, 217, 218, 325	.23[a]
165, 265, 267, 268, 365	.24[a]
Hycar 2202	.65[c]
Polysar Butyl 100, 200, 300, 400	.245[c]
101	.2775[a]
301	.255[c]
Vistanex	.45[a]

Neoprene

Neoprene Type AC, CG	.55[a]
GN, GN-A	.41[a]
GRT, S	.42[a]
KNR	.75[a]
W	.39[a]
WRT	.45[a]

Latices

Neoprene Latex 571, 842-A	.37[a]
572	.39[a]
601-A	.40[a]
735, 736	.38[a]
950	.47[a]

Nitrile Types

Butaprene NAA	.54[a]
NF	.49[a]
NL	.50[a]
NXM	.58[a]
Chemigum N1NS	.64[b]
N3NS, N5	.58[b]
N6, N-6B, N7	.50[b]
Hycar 1001, 1041	.58[c]
1002, 1042, 1042	.50[c]
1014, 1312	.60[c]
1411	.62[c]
1432	.59[c]
1441	.64[c]
Paracril AJ	.485[c]
B, BJ, BLT	.50[c]
C	.58[c]
CV	.59[c]
D	.65[c]
1880	.60[a]
Polysar Krynac 800, 802, 803	.50[c]
801	.58[c]

Latices

Butaprene N-300	$0.46[b]
N-400, N-401	.54[b]
Chemigum	.49[b]
235 CHS, 236	.54[b]
245 B, 245 CHS, 246	.46[b]
Hycar 1512, 1552, 1562, 1577	.46[c]
1551, 1561	.54[c]
1571	.59[c]
1572	.51[c]
Nitrex 2612, 2614	.46[a]
2615	.51[a]

Polysulfide Types

Thiokol LP-2, -3, -32, -33	.96[a]
-8, -38	1.25[a]
PR-1	.95[a]
Type-A	.47[a]
FA	.69[a]
ST	1.00[a]

Latices

Thiokol Latex (dry wt.)	
Type MF	.85[a]
MX	.70[a]
WD-2	.92[a]
-5	.95[a]
-6, -7	.70[a]

Silicone Types

GE (compounded)	$2.25[a] / $4.10[a]
Silicone gum (not compounded)	4.00[a] / 4.90[a]
Silastic (compounded)	1.95[b] / 3.65[b]
(Partly compounded)	3.38[b] / 3.90[b]
(Uncompounded)	3.85[b] / 4.50[b]

Styrene Types†

Hot SBR‡

FR-S 1000, 1004, 1006	.23[a]
1009, 1013	.26[a]
1010	.265[a]
1012	.27[a]
1015	.28[a]
G-G 1000, 1001, 1006	.241[c]
Naugapol 1016, 1019	.265[b]
1018	.27[b]
1021	.30[b]
1022	.28[b]
1023	.285[b]
Philprene 1000, 1001, 1006	.25[b]
1009	.255[b]
1018	.27[b]
1019	.265[b]
Plioflex 1006	.241[c]
Polysar S, S-50, S-65	.241[c]
SS-250	.30[c]
S-X-371	.255[c]
S-1000, -1001, -1006, -1013	.23[a]
-1002, -1011	.2325[a]
Synpol 1000, 1001, 1006, 1061	.241[b]
1002	.2435[b]
1007, 1012	.2425[b]
1009	.2475[b]
1013	.25[b]

Hot SBR Black Masterbatch

S-1100	.185[a]

Cold SBR

ASRC-1500, -1502	.241[c]
Copo 1500, 1502	.241[c]
FR-S 1500, 1502	.23[a]
G-G 1500, 1501, 1502	.241[c]
Naugapol 1503	.27[b]
1504	.295[b]
Philprene 1500, 1502	.25[b]
1503	.27[b]
Plioflex 1502	.241[c]
Polysar Krylene	.241[c]
S-1500, -1501, -1502	.23[b]
Synpol 1500, 1502, 1551	.241[b]

Cold SBR Black Masterbatch

Baytown 1600, 1601, 1602	.185[a]
Philprene 1601	.198[b]
1605	.194[b]
S-1600, -1601, -1602	.18[a]

Cold SBR Oil Masterbatch

FR-S 1703	$0.195[a]
1705	.1925[a]
1710	.1775[a]
G-G 1703	.206[c]
1705	.2035[c]
1707	.191[c]
1710, 1712	.1885[c]
Philprene 1703	.212[b]
1706	.21[b]
1708	.197[b]
1712	.194[b]
Plioflex 1703	.2075[c]
1710	.19[c]
Polysar Krynol	.20[c]
S-1703	.195[a]
-1706	.1925[a]
-1707	.18[a]
-1709, -1712	.1775[a]
Synpol 1703	.2075[b]
1707	.1925[b]
1708	.195[b]
1711	.19[b]

Cold SBR Oil-Black Masterbatch

Baytown 1801	.17[a]
Philprene 1803	.179[b]
S-1801	.165[a]

Hot SBR Latices

FR-S 2000, 2001, 2006	.26[a]
2002	.285[a]
2003, 2004	.295[a]
Naugatex 2000, 2001, 2006	.263[a]
2002	.288[a]
2005	.30[a]
S-2000	.2275[a]
D-2006	.215[a]

Cold SBR Latices

FR-S 2105	.31[a]
Copo 2101	.28[c]
2102, 2105	.31[c]
X-765	.29[c]
Naugatex 2101	.285[a]
2105	.312[a]
X-767	.323[a]
Pliolite Latex 2101, X765	.30[c]
2105	.32[c]
S-2101	.225[a]

Cold BR Latex§

Pliolite Latex 2104	.32[c]

[a] Freight extra.
[b] Minimum freight allowed.
[c] Freight prepaid.
*Prices are per pound carload or tank-car dry weight unless otherwise specified.
†Listed below are the new GR-S type synthetic rubbers and latices trade names and the chief sales offices of their producers or distributors.

ASRC —American Synthetic Rubber Corp., 500 Fifth Ave., New York 36, N. Y.
Baytown —United Rubber & Chemical Co., Baytown, Tex. (producer); United Carbon Co., Inc., Charleston 27, W. Va. (distributor).
Butaprene, FRS —Firestone Tire & Rubber Co., Synthetic Rubber Division, 381 Wilbeth Rd., Akron 1, O.
Copo —Copolymer Rubber & Chemical Corp., P. O. Box 1029, Baton Rouge 1, La.
G-G —Goodrich-Gulf Chemicals, Inc., 3121 Euclid Ave., Cleveland 15, O.
Naugapol, Naugatex —Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.
Philprene —Phillips Chemical Co., Rubber Chemicals Division, 318 Water St., Akron 8, O.
Plioflex —Goodyear Tire & Rubber Co., Chemical Division, Akron 16, O.
Pliolite Latex —Goodyear Tire & Rubber Co., Chemical Division. Also distributed by General Latex & Chemical Corp., 666 Main St., Cambridge 39, Mass.
Polysar —Polymer Corp., Ltd., Sarnia, Ont., Canada (producer); H. Muehlstein & Co., Inc., 60 E. 42nd St., New York 17, N. Y. (distributor).
S- —Shell Chemical Corp., Synthetic Rubber Sales Division, 30 W. 50th St., New York 20, N. Y.
Synpol —Texas-U. S. Chemical Co., Port Neches, Tex. (producer); Naugatuck Chemical (distributor).
‡SBR —Styrene butadiene rubber.
§BR —Butadiene rubber.

West Germany

Postwar Synthetic Plant

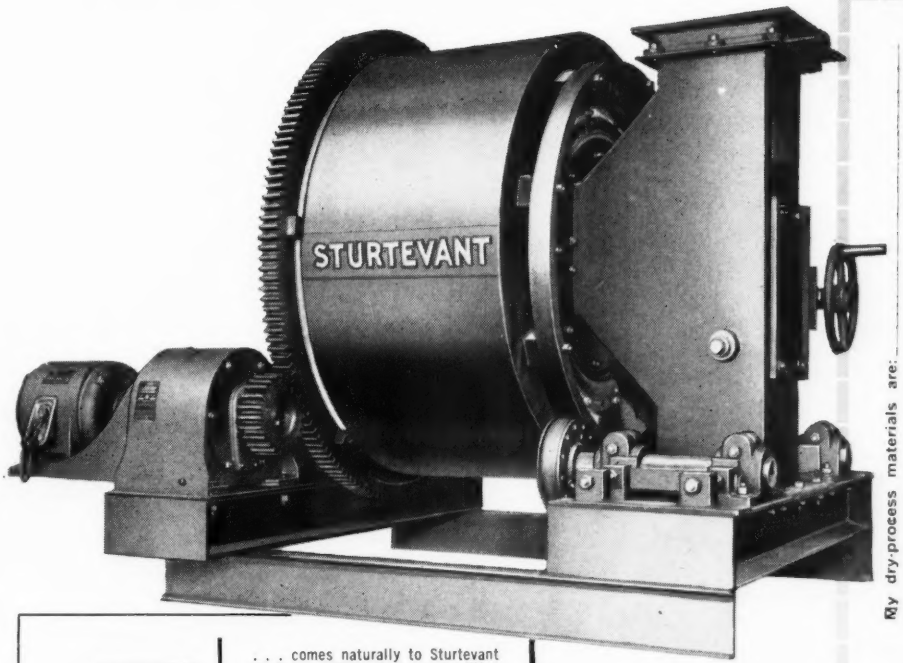
West Germany's first major venture into the synthetic rubber field, the 45,000-ton-a-year Buna plant at Marl, is not expected to be in operation before 1958, according to the director of Bunawerk Huels G.m.b.H., which will operate the plant. The capacity tonnage represents about 25% of West Germany's current rubber consumption.

Bunawerk Huels was jointly organized last year by Chemische Werke Huels AG, which owns 50% of the stock, and Bayer Leverkusen, Farbwerke Hoechst, and BASF of Lundwigshafen, the three major successors of the former I. G. Farben Corp.

During the postwar period Chemische Werke Huels has been producing synthetic rubber on a minor scale, averaging 750 tons per month, from acetylene. Production in the new plant will be based on butane.

Cost of the new plant is estimated at $100 million. About 400 people will be employed.

COSTS OF BETTER BLENDS CUT TWO TESTED WAYS



ENGINEERING BLENDING AND OTHER DRY PROCESSES TO SPECIFICATIONS

. . . comes naturally to Sturtevant Engineers. They have a tradition of solving dry-processing problems since 1873. Sturtevant custom-built equipment and plants are well-known for their low-maintenance-cost operation. If your problems include any of the processes listed on the coupon, it will pay you to investigate.

Sturtevant Dry-Batch Blenders:

1. SPEED UP PRODUCTION WITH 4-WAY MIXING

2. SHORTEN SHUT-DOWNS WITH "OPEN-DOOR" DESIGN

Batches from 500 to 40,000 pounds come out of Sturtevant Dry-Batch Blenders exactly as you want them. They are completely blended regardless of the varying weights, densities or fineness of the different ingredients. And no dust is lost in the process.

Four different vertical and lateral mixing actions inside the sealed rotating drum achieve thorough blending in minimum time. Single lever control of a single gate speeds up loading and discharging.

"Open-Door" accessibility makes cleaning and maintenance a matter of minutes. This original Sturtevant advantage plus 75-year-tested rugged construction assures more output per machine-year. Check the coupon for more information.

STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

My dry-process materials are: _____

Desired capacity is: _____

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

STURTEVANT MILL COMPANY, 136 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Dry Blenders ☐
Also bulletins on machines for:

☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ SEPARATING ☐ BLENDING
☐ SUPERFINE SELECTING ☐ GRANULATING ☐ CONVEYING

Compounding Ingredients*

Abrasives

Pumicestone, powdered	lb.	$0.0363/	$0.065
Rottenstone, domestic	lb.	.03 /	.04
Shelblast	ton	80.00 /	165.00
Walnut Shell Grits	ton	50.00 /	160.00

Accelerators

A-1 (Thiocarbanilide)	ton	.50 /	.57
A-32	ton	.66 /	.80
A-100	lb.	.52 /	.66
Accelerator 49	lb.	.55 /	.56
108	lb.	.90	
552	lb.	2.25	
808	lb.	.66 /	.68
833	lb.	1.17 /	1.19
Altax	lb.	.50 /	.52
Arazate	lb.	2.25	
Beutene	lb.	.66 /	.71
Bismate	lb.	3.00	
B-J-F	lb.	.27 /	.32
Butasan	lb.	1.04	
Butazate	lb.	1.04	
Butyl Accelerator 21	lb.	.89	
Eight	lb.	1.10 /	1.35
Zimate	lb.	1.04	
Captax	lb.	.40 /	.42
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Diesterex N	lb.	.50 /	.57
DOTG (diorthotolylguanidine)			
Cyanamid	lb.	.60 /	.61
Du Pont	lb.	.57 /	.58
DPG (diphenylguanidine)			
Cyanamid	lb.	.50 /	.51
Monsanto	lb.	.48 /	.55
El-Sixty	lb.	.58 /	.65
Ethasan	lb.	1.04	
Ethazate	lb.	1.04	
50-D	lb.	.85	
Ethyl Thiurad	lb.	1.04	
Tuads	lb.	1.04	
Tuex	lb.	1.04	
Zimate	lb.	1.04	
Ethylac	lb.	.93 /	.95
Hepteen	lb.	.44 /	.50
Base	lb.	1.85	
Ledate	lb.	1.04	
MBT (2-mercaptobenzothiazole)			
American Cyanamid	lb.	.40 /	.42
Du Pont	lb.	.38 /	.40
Naugatuck	lb.	.40 /	.45
-XXX, Cyanamid	lb.	.51 /	.53
MBTS (mercaptobenzothiazyl disulfide)			
Cyanamid	lb.	.50 /	.52
Du Pont	lb.	.48 /	.50
Naugatuck	lb.	.50 /	.55
-W Cyanamid	lb.	.53 /	.55
Merac	lb.	.75 /	1.05
Mertax	lb.	.51 /	.58
Methasan	lb.	1.04	
Methazate	lb.	1.04	
Methyl Tuads	lb.	1.14	
Zimate	lb.	1.04	
Monex	lb.	1.14	
Mono-Thiurad	lb.	1.14	
Morfex	lb.	.65 /	.70
MT	lb.	1.00	
NOBS No. 1	lb.	.72 /	.74
Special	lb.	.77 /	.79
O-X-A-F	lb.	.51 /	.56
Pentex	lb.	1.04	
Flour	lb.	.21	
Permalux	lb.	2.17	
Phenex	lb.	.52 /	.59
Pip-Pip		2.07	
R-2 Crystals	lb.	4.35	
Rotax	lb.	.51 /	.53
RZ-50, -50B	lb.	1.00	
S. A. 52	lb.	1.14	
57, 62, 67, 77	lb.	1.04	
66	lb.	2.50	
Santocure	lb.	.72 /	.79
NS	lb.	.78 /	.85
Selenacs	lb.	4.25	
Sharples 52-1, 52-3, 52-9	lb.	1.14	
62-0, 62-9, 57-1, 57-3, 57-9, 67-1, 77-0	lb.	1.04	
66-1	lb.	4.25	
SPDX-GH	lb.	.69 /	.74
GL	lb.	1.20 /	1.34
Tellurac	lb.	1.21	
Tepidone	lb.	.45	
Tetrone A	lb.	1.91	
Thiofide	lb.	.50 /	.57
S	lb.	.52 /	.59
Thionex	lb.	1.14	
Thiotax	lb.	.40 /	.47
Thiurad	lb.	1.14	
Thiuram E	lb.	1.04	
M	lb.	1.14	
Trimene	lb.	.56 /	.62
Base	lb.	1.03 /	1.10
Tuex	lb.	1.14	
Ultex	lb.	$1.00 /	$1.10
Unads	lb.	1.14	
Ureka Base	lb.	.66 /	.73
Vulcacure NB	lb.	.45	
ZB, ZE, ZM	lb.	.85	
Vulcacure Z-B-X	lb.	2.45	
Zenite	lb.	.48 /	0.50
A	lb.	.49 /	.51
Special	lb.	.49 /	.51
Zetax	lb.	.51 /	.53
Zimate	lb.	1.04	

Accelerator-Activators, Inorganic

Lime, hydrated	ton	20.21	
Litharge, comml.	lb.	.175 /	.18
Eagle, sublimed	lb.	.18	
National Lead, sublimed	lb.	.18 /	.19
Red lead, comml.	lb.	.185 /	.195
Eagle	lb.	.19	
National Lead	lb.	.19 /	.20
White lead, carbonate	lb.	.19 /	.20
Eagle	lb.	.19 /	.20
National Lead	lb.	.18 /	.19
Silicate	lb.	.1725/	.1825
Eagle	lb.	.20 /	.2175
National Lead	lb.	.1625/	.1725
Zinc oxide, comml.†	lb.	.145/	.1925

Accelerator-Activators, Organic

Aktone	lb.	.2125/	.2325
Barak	lb.	.62	
Capital 170	lb.	.2175/	.2575
171	lb.	.1325/	.1725
700, 701	lb.	.16 /	.20
705, 710	lb.	.16 /	.20
800	lb.	.12/	.14
801	lb.	.1425/	.1625
802	lb.	.1475/	.1675
803	lb.	.17 /	.19
Curade	lb.	.57 /	.59
D-B-A	lb.	1.95	
Emery 600	lb.	.1375/	.1775
Groco 30	lb.	.1375/	.1775
35	lb.	.1425/	.1825
Guantal	lb.	.57 /	.64
Hyfac 400	lb.	.1063/	.1325
430	lb.	.1613/	.1875
431	lb.	.1838/	.1975
Hystrene S-97	lb.	.1863/	.2125
T-45	lb.	.1638/	.19
T-70	lb.	.1738/	.20
Industrene B	lb.	.1263/	.1525
R	lb.	.1138/	.14
158	lb.	.1313/	.1575
254	lb.	.1413/	.1675
262	lb.	.1513/	.1775
Laurex	lb.	.33 /	.37
MODX	lb.	.295 /	.345
NA-22	lb.	1.50	
Oleic acid, comml.	lb.	.185 /	.225
Emersol 210 Flaine	lb.	.165 /	.205
Groco 2, 4, 8, 18	lb.	.165 /	.205
Plastone	lb.	.27 /	.30
Polyvac	lb.	1.65	
Ridacto	lb.	.25 /	.26
Seedine	lb.	.1485/	.1703
Stearex Beads	lb.	.1488/	.1588
Stearic acid			
Emersol 120	lb.	.1463/	.1725
150	lb.	.1738/	.20
Hydrofol 51	lb.	.09	
Hydrogenated, rubber grd.			
Groco	lb.	.125 /	.145
Rufat 75	lb.	.1188/	.145
Single pressed, comml.	lb.	.1475/	.1675
Emersol 110	lb.	.1413/	.1675
Groco 53	lb.	.1475/	.1675
Wilmar 253	lb.	.1413/	.1675
Double pressed, comml.	lb.	.1525/	.1725
Groco 54	lb.	.1525/	.1725
Wilmar 254	lb.	.1463/	.1725
Triple pressed, comml.	lb.	.175 /	.195
Groco 55	lb.	.175 /	.195
Wilmar 255	lb.	.1688/	.195
Sterene 60-R	lb.	.09 /	.1075
Tonox	lb.	.515 /	.605
Vulklor	lb.	.88 /	1.08
Wilmar 110	lb.	.165 /	.205
434	lb.	.1375/	.1775
Zinc stearate, comml.	lb.	.39 /	.44

Antioxidants

AgeBest A26	lb.	.18 /	.24
620-32B	lb.	.20 /	.26
716-30	lb.	.18 /	.24
1041-21	lb.	.165 /	.225
1293-22A	lb.	1.90 /	2.00
AgeRite Alba	lb.	2.35 /	2.45
Gel	lb.	.64 /	.66
H. P.	lb.	.72 /	.74
Hipar	lb.	.98 /	1.00
Powder	lb.	.52 /	.54
Resin	lb.	.75 /	.77
D	lb.	.52 /	.54
Spar	lb.	.52 /	.54
Stalite	lb.	.52 /	.54
S	lb.	.52 /	.54
White	lb.	1.45 /	1.55
Akroflex C	lb.	.77 /	.79
CD	lb.	.72 /	.74
Albasan	lb.	.69 /	.73
Allied AA-1144	lb.	$0.23 /	$0.24
AA-1177	lb.	.155 /	.165
Aminox	lb.	.52 /	.57
Antioxidant 425	lb.	2.47 /	2.50
2246	lb.	1.50 /	1.53
Antisol	lb.	.23 /	.24
Antisun	lb.	.15 /	.51
Antox	lb.	.52 /	.75
Aranox	lb.	3.25	.54
Betanox Special	lb.	.80 /	.85
B-L-E, -25	lb.	.52 /	.57
Burgess Antisun Wax	lb.	.185	
B-X-A	lb.	.52 /	.57
Copper Inhibiter X-872-L	lb.	2.01	
D-B-P-C	lb.	.91 /	1.16
Flectol H	lb.	.52 /	.59
Flexamine	lb.	.72 /	.77
Heliozone	lb.	.26 /	.27
Ionol	lb.	.91 /	1.40
NBC	lb.	1.55	
Neozone A	lb.	.56 /	.58
D	lb.	.52 /	.54
Octamine	lb.	.52 /	.57
PDA-10	lb.	.46 /	.48
Perflectol	lb.	.61 /	.68
Polygard	lb.	.52 /	.57
Protector	lb.	.26 /	.31
Rio Resin	lb.	.60 /	.62
Santoflex 35	lb.	.72 /	.79
75	lb.	.92 /	.99
AW	lb.	.78 /	.85
B	lb.	.52 /	.59
BX	lb.	.63 /	.70
DD	lb.	.52 /	.59
Santovar A	lb.	1.50 /	1.57
Santowhite Crystals, Powder	lb.	1.60 /	1.67
L	lb.	.52 /	.59
MK	lb.	1.29 /	1.36
Sharples Wax	lb.	.23 /	.28
Stabilite	lb.	.55 /	.59
Alba	lb.	.72 /	.79
L	lb.	.60 /	.64
White	lb.	.52 /	.60
Powder	lb.	.41 /	.47
Styphen I	lb.	.51 /	.55
Sunolite #100	lb.	.21 /	.23
#127	lb.	.17 /	.19
Sunproof -713	lb.	.25 /	.30
Improved	lb.	.25 /	.30
Jr.	lb.	.20 /	.25
Tenamene 3	lb.	.91 /	1.05
Thermoflex A	lb.	.98 /	1.00
Tonox	lb.	.52 /	.57
Tysonite	lb.	.24 /	.2475
Velvapex 51-250	lb.	.40	
V-G-B	lb.	.70 /	.70
Wing-Stay S	lb.	.52 /	.61
Zenite	lb.	.48 /	.55

Antiozonants

Tenamene 30, 31	lb.	1.36 /	1.38

Antiseptics

Copper naphthenate, 6–8%	lb.	.24	
Pentachlorophenol	lb.	.21 /	.29
Resorcinol, technical	lb.	.775 /	.785
Zinc naphthenate, 8-10%	lb.	.245 /	.30

Blowing Agents

Ammonium bicarbonate	lb.	.065 /	.085
Carbonate	lb.	.16	
Blowing Agent CP-975	lb.	.35	
Celogen	lb.	1.95	
50-C	lb.	1.01 /	1.07
Sodium bicarbonate	100 lbs.	2.80 /	3.15
Carbonate, tech.	100 lbs.	1.35 /	5.52
Sponge Paste	lb.	.20	
Unicel	lb.	.90	
ND	lb.	.76	
S	lb.	.20	

Bonding Agents

Braze	gal.	6.00 /	9.00
Cover cement	gal.	2.50 /	4.00
Flocking Adhesive RFA17, RFA22, RFA25	lb.	.50	
G-E Silicone Paste SS-15	lb.	4.52 /	5.10
SS-64	lb.	3.65 /	6.75
-67 Primer	lb.	7.50 /	12.50
Gen-Tac Latex	lb.	.70 /	.805
Kalabond Adhesive	gal.	6.50 /	16.00
Tie Cement	gal.	2.00 /	5.60
Hylene M	gal.	3.50 /	3.75
M-50	gal.	1.90 /	2.15
Thixons	gal.	1.48 /	12.00
Ty Ply BN, Q, S, UP, 3640	gal.	6.75 /	8.00
RC	gal.	3.75 /	5.00

Brake Lining Saturants

BRT 3	lb.	.018 /	.0265
Resinex L-S	lb.	.0225/	.03

Carbon Blacks‡

Conductive Channel—CC

Continental R-40	lb.	.23 /	.30
Kosmos/Dixie BB	lb.	.23 /	.30
Spheron C	lb.	.15 /	.195
Voltex	lb.	.18 /	.315

Easy Processing Channel—EPC

Collocarb EPC	lb.	.059 /	.099
Continental AA	lb.	.074 /	.1225
Kosmobile 77/Dixiedensed 77	lb.	.074 /	.1225

* Prices, in general, are f.o.b. works. Range indicates grade or quantity variations. No guarantee of these prices is made. Spot prices should be obtained from individual suppliers.

† For trade names, see Color—White, Zinc Oxides.

‡ At the request of the suppliers, the lowest prices shown for carbon blacks are for carloads in bags. Prices for hopper carloads are lower.

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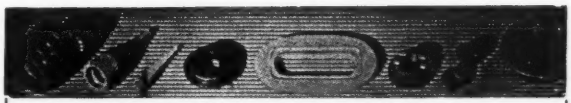

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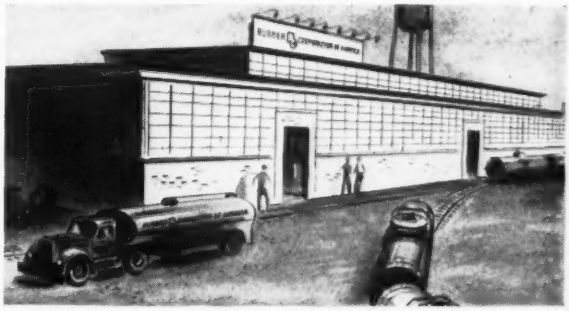

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Spheron #9	lb.	.074 /	.1225
Texas E	lb.	.074 /	.1225
Witco #12	lb.	.074 /	.1225
Wyex EPC	lb.	.07 /	.11
Hard Processing Channel—HPC			
Continental F	lb.	.074 /	.1225
HX HPC	lb.	.074 /	.1225
Kosmobile S/Dixiedensed S	lb.	.074 /	.1225
Micronex Mk. II	lb.	.074 /	.1225
Witco #6	lb.	.074 /	.1225
Medium Processing Channel—MPC			
Arrow MPC	lb.	.07 /	.11
Continental A	lb.	.074 /	.1225
Kosmobile S-66/Dixiedensed S-66	lb.	.074 /	.1225
Micronex Standard	lb.	.074 /	.1225
Spheron #6	lb.	.074 /	.1225
Texas 109	lb.	.079 /	.1275
M	lb.	.074 /	.1225
Witco #1	lb.	.074 /	.1225
Conductive Furnace—CF			
Aromex CF	lb.	.08 /	.12
Vulcan C	lb.	.105 /	.15
SC	lb.	.18 /	.223
Fast Extruding Furnace—FEF			
Arovel FEF	lb.	.06 /	.10
Continex FEF	lb.	.06 /	.10
Kosmos 50/Dixie 50	lb.	.06 /	.10
Statex M	lb.	.06 /	.10
Sterling SO	lb.	.06 /	.10
Fine Furnace—FF			
Statex B	lb.	.065 /	.105
Sterling 99	lb.	.065 /	.105
High Abrasion Furnace—HAF			
Aromex HAF	lb.	.07 /	.11
Continex HAF	lb.	.079 /	.125
Kosmos 60/Dixie 60	lb.	.079 /	.1175
Philblack O	lb.	.074 /	.114
Statex R	lb.	.074 /	.12
Vulcan #3	lb.	.074 /	.114
Intermediate Super Abrasion Furnace—ISAF			
Aromex ISAF	lb.	.085 /	.125
Kosmos 70/Dixie 70	lb.	.10 /	.145
Philblack I	lb.	.09 /	.13
Statex 125	lb.	.09 /	.135
Vulcan 6	lb.	.09 /	.13
Medium Abrasion Furnace—MAF			
Philblack A	lb.	.06 /	.10
Super Abrasion Furnace—SAF			
Philblack E	lb.	.125 /	.165
Vulcan 9	lb.	.125 /	.165
General Purpose Furnace—GPF			
Arogen GPF	lb.	.05 /	.09
Sterling V	lb.	.05 /	09
V Non-staining	lb.	.05 /	.09
High Modulus Furnace—HMF			
Collocarb HMF	lb.	.045 /	.085
Continex HMF	lb.	.055 /	.095
Kosmos 40/Dixie 40	lb.	.055 /	.095
Modulex HMF	lb.	.0525/	.0925
Statex 93	lb.	.055 /	.095
930	lb.	.047 /	.087
Sterling L, LL	lb.	.055 /	.095
Semi-Reinforcing Furnace—SRF			
Collocarb SRF	lb.	.042 /	.082
Continex SRF	lb.	.045 /	.085
Essex SRF	lb.	.0475/	.0875
Furnex	lb.	.0475/	.0875
Gastex	lb.	.0525/	.0925
Kosmos 20/Dixie 20	lb.	.045 /	.085
Pelletex, NS	lb.	.0475/	.0875
Sterling NS, S	lb.	.0475/	.0875
R	lb.	.0525/	.0925
Fine Thermal—FT			
P-33	lb.	.0575	
Sterling FT	lb.	.055	
Medium Thermal—MT			
Sterling MT	lb.	04	
Non-staining	lb.	.05	
Thermax	lb.	.04	
Stainless	lb.	.05	

Colors

Black

Iron oxides, comml	lb.	.1325/	.135
BK—Lansco	lb.	.1275/	.13
Williams	lb.	.145	
Lansco synthetic	lb.	10	
Mapico	lb.	.1425/	.145
Lampblack, comml	lb	.16 /	.45
Superjet	lb.	.0825/	.1175
Permanent Blue	lb.	.80 /	1.05
Stan-Tone	lb.	.45 /	1.20
Vansul masterbatch	lb.	.60 /	.65
Paste	lb.	.14 /	.15

Blue

Alkali Blue	lb.	1.12 /	2.10
Cyanamid ultramarine	lb.	.29	
Du Pont	lb.	1.77 /	4.55
Filo	lb.	$0 28	
Heveatex pastes	lb.	.80 /	$1.45
Lansco ultramarines	lb.	.25 /	.28
Monsanto Blue 7	lb.	1.55	
11	lb.	3.45	
DPB-283	lb.	1.93	
S-11	lb.	2.05	
Permanent Blue	lb.	.80 /	1.05
Stan-Tone	lb.	1.55 /	1.60
Vansul masterbatch	lb.	.90 /	2.70

Brown

Filo	lb.	.13	
Iron oxides, comml	lb.	.1425/	.145
Lansco synthetic	lb.	.125	
Mapico Brown	lb.	.1525/	.155
Sienna, burnt, comml	lb.	.0425/	.155
Williams	lb.	.115 /	.1775
Raw, comml	lb.	.045 /	.1325
Williams	lb.	.08 /	.1725
Umber, burnt, comml	lb.	.06 /	.07
Williams	lb.	.0725/	.085
Raw, comml	lb.	.0625/	.07
Williams	lb.	.07 /	.0825
Williams, pure brown	lb.	.155	
Vandyke	lb.	.12	
Mapico Tan 20	lb.	.2025/	.205
Tan 15	lb.	.205	
Metallic Brown	lb.	.05 /	.06
Vansul masterbatch	lb.	2.10 /	2.20

Green

Chrome	lb.	.19 /	.50
Oxide	lb.	.3925/	1.10
Cyanamid	lb.	1.10	
G-4099, -6099	lb.	.425	
GH-9869	lb.	1.05 /	1.20
9976	lb.	1.15 /	1.30
Green	lb.	.80 /	2.40
Du Pont	lb.	1.97 /	2.80
Filo	lb.	.40	
Heveatex pastes	lb.	.95 /	1.85
Lansco Toner	lb.	1.35	
Monsanto Green 3	lb.	2.75	
14	lb.	1.45	
17	lb.	3.95	
71205	lb.	1.35	
DGP	lb.	2.03	
S-17	lb.	2.25	
Stan-Tone	lb.	1.75 /	4 60
Vansul masterbatch	lb.	2.00 /	2.60

Orange

Cyanamid Permatons	lb.	1.35	
Du Pont	lb.	2.75	
Monsanto Orange 68187	lb.	2.90	
Stan-Tone	lb.	.70 /	5.05
Vansul masterbatch	lb.	2.00 /	2.60

Red

Antimony trisulfide	lb.	.285 /	.315
R. M. P. No. 3	lb.	.72	
Sulfur Free	lb.	.78	
Brilliant Toning Red	lb.	1.95	
Cadmium red lithopones	lb.	2.21 /	3.77
Cadmolith	lb.	1.72 /	2.20
Cyanamid	lb.	.85 /	1.60
Du Pont	lb.	1.47 /	1.80
Filo	lb.	.11	
Indian Red	lb.	.1275	
Iron oxide, comml	lb.	.06 /	.13
Lansco synthetic	lb.	.1175	
Mapico	lb.	.1375/	.14
Recco	lb.	.12	
Williams Red	lb.	.13 /	.1525
Monsanto Maroon 113	lb.	1.50	
61148	lb.	1.75	
Red 7	lb.	1.55	
41	lb.	4.40	
3501	lb.	1.15	
4004	lb.	1.50	
69191	lb.	3.38	
Autumn	lb.	1.10	
PRP-285	lb.	1.27	
S-44	lb.	1.28	
Rub-Er-Red	lb.	.0975	
Stan-Tone	lb.	.85 /	6.15
Vansul masterbatch	lb.	.95 /	3.30
Venetian	lb.	.04 /	.0675

White

Antimony oxide	lb.	.27 /	.285
Burgess Iceberg	ton	50 00 /	80.00
Cryptone BT	lb.	.10 /	.11
Permolith	lb.	.075 /	.085
Titanium pigments			
Rayox LW	lb.	.195 /	.205
R-110	lb.	.215 /	.225
Ti-Cal	lb.	.075 /	.0825
Ti-Pure	lb.	.195 /	.225
Titanox A, AA, A-168	lb.	.21 /	.22
C-50	lb.	.1225/	.1275
RA, -10, -50	lb.	.23 /	.24
RC	lb.	.0825/	.0875
-HT, -HTX	lb.	.08 /	.085
Unitane	lb.	.245 /	.275
Zonaque Anatase	lb.	.245 /	.27
Rutile	lb.	.205 /	.29
Zinc oxide, comml	lb.	.145 /	.1825
Azo ZZZ-11, -44, -55	lb.	.145 /	.165
20% leaded	lb.	.1505/	.1705
35% leaded	lb.	.155 /	.175
50% leaded	lb.	.1588/	.1788
Eagle AAA, lead free	lb.	.145 /	.155
5% leaded	lb.	.145 /	.155
35% leaded	lb.	.155 /	.165
50% leaded	lb.	.159 /	.169
Florence Green Seal	lb.	$0.1625/	$0.1725
Red Seal	lb.	.1575/	.1675
White Seal	lb.	.1675/	.1775
Horsehead XX-4, -78	lb.	.145 /	.155
Kadox-15, -17, -72, -515	lb.	.145 /	.155
-25	lb.	.1675/	.1775
Lehigh, 35% leaded	lb.	.155	
50% leaded	lb.	.1588/	.1788
Protox-166, -167	lb.	.145 /	.165
St. Joe, lead free	lb.	.122 /	.152
Zinc sulfide, comml	lb.	.253 /	.263
Cryptone ZS	lb.	.253 /	.273

Yellow

Cadmium yellow lithopones	lb.	1.12 /	1.15
Cadmolith	lb.	1.12 /	1.20
Cyanamid Hansa Yellow	lb.	2.10	
Du Pont	lb.	1.80 /	2.15
Filo	lb.	.10	
Iron oxide, comml	lb.	.0525/	.1175
Lansco synthetic	lb.	.1075	
Mapico	lb.	.115 /	.1225
Williams	lb.	.115 /	.1225
Monsanto Yellow 14	lb	1.91	
10010	lb.	1.91	
BYP-282	lb.	1.21	
GA	lb.	2.45	
S-10010	lb.	1.17	
Stan-Tone	lb.	1.00 /	1.55
Vansul masterbatch	lb.	.95 /	1.95
Williams Ocher	lb.	.0575/	.06

Dusting Agents

Diatomaceous silica	ton	32.00 /	48 00
Extrud-o-Lube, conc	gal.	1.54 /	1.69
Glycerized Liquid Lubricant, concentrated	gal.	1.48 /	1.63
Latex-Lube GR	lb.	.20	
Pigmented	lb.	.1825	
R-66	lb.	.165	
Liqui-Lube	lb.	.1625	
N. T.	lb.	.1675	
Liquizinc No. 305	lb.	.30 /	.35
Lubrex	lb.	.25 /	.30
Mica Concord	lb.	.075 /	.0825
Mineralite	ton	45.00	
Pyrax A	ton	13 50	
W. A.	ton	16.00	
Talc, comml	ton	18.40 /	38.50
EM	ton	11.00 /	63.00
LS Silver	ton	29.25	
Nytals	ton	25.00 /	36.00
Sierra Sagger 7	ton	34.00	
White IR	ton	19.75	
III	ton	20.75	
Vanfre	gal.	2.00 /	

Extenders

BRS 700	lb.	.02 /	.0285
BRT 7	lb.	.03 /	.031
Cumar Resins	lb.	.065 /	.17
Dielex B	lb.	.06	
Factice, Amberex	lb.	.29 /	.36
Brown	lb.	.1425/	.268
Neophax	lb.	.157 /	.268
White	lb.	.144 /	.285
G. B. Asphaltenes	lb.	.06 /	.065
Millex, W	lb.	.07	
Mineral Rubbers			
Black Diamond	ton	38 00 /	40.00
Hard Hydrocarbon	ton	46 50 /	48.50
Hydrocarbon MR	ton	45 00 /	55.00
Parmr	ton	21.00 /	29.00
T-MR Granulated	ton	47.50 /	50.00
Nuba No. 1, 2	lb.	.0575/	.0625
3X	lb.	.0775/	.0825
OPD-101	lb.	.26	
Rubber substitute, brown	lb.	.1835/	2012
Car-Bel-Ex A	lb.	.14	
Car-Bel-Lite	lb.	.35	
Extender 600	lb.	.1765	
White	lb.	.148 /	256
Stan-Shells	ton	35.00 /	73 00
Sublac Resin PX-5	lb.	.215 /	.235
Synthetic 100	lb.	.41	
Vistanex	lb.	.35 /	475

Fillers, Inert

Agrashell flour	ton	50.00 /	74.00
Barytes, floated, white	ton	41.60 /	60.10
Off-color, domestic	ton	25.00	
No. 1	ton	41.35 /	60.10
2	ton	39 35 /	58.00
Sparmite	ton	75.00 /	80.00
Blanc fixe	ton	100.00 /	165.00
Burgess Iceberg	ton	50.00 /	80.00
Pigment #20	ton	35.00 /	60.00
#30	ton	37.00 /	60.00
HC-75	ton	12.00 /	30.00
-80	ton	14.00 /	32.00
WP #1	ton	11.00 /	16.00
Cary #200	ton	30.00 /	55.00
Citrus seed meal	lb.	.04	
Oil	lb.	.15	
Clays			
A. F. D. Filler	ton	26.50 /	100.00
Aiken	ton	14.00	
Albacar	ton	50.00 /	55.00
Aluminum Flake	ton	22.25 /	60.00
#5	ton	24.50 /	30.00
Champion	ton	14.00	
Crown	ton	14.00 /	33.00
Dixie	ton	14.00	
Franklin	ton	13.50 /	35.25
GK Soft Clay	ton	11.00	
Hi-White R	ton	13.50	
Hydratex R	ton	26.00	
Kaolloid	ton	10.50	

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TWO RUBBER CHEMICAL SALESMEN, WITH EXCELLENT technical service background seek new association with rubber chemicals distributor, or rubber chemicals manufacturer. Wide contacts from Akron to Atlantic Coast. Business builders with industry-wide following. Address Box No. 1941, care of RUBBER WORLD.

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For full-time project or one or two days per week. Varied experience in compounding mechanical goods, high-speed molding, sundries, soles and heels, adhesives, toys, calendered goods, and extrusions. Experienced in quality-control testing, research, development, production, and costs. Rubber and Plastics. Address Box No. 1942, care of RUBBER WORLD.

MACHINERY & SUPPLIES FOR SALE

STOKES 280-A, 4" DIA., SINGLE-PUNCH PREFORM MACHINE. Stokes & Kux 2½" dia. single-punch Preform Machines. Farrel 15" x 36" 2-roll rubber mill and sizes up to 84". New and used Lab. 6" x 13", 6" x 16", and 8" x 16" mills and calenders. Day Imperial 75- & 150-gal. Jack. Mixers. Baker-Perkins Jacketed Mixers 100 & 50 gals. Farrel 200-ton Hydr. Press 20" x 80" platens. Brunswick 225-ton 21" x 21" platens, 150-ton 24" x 24" platens. 80-ton 20" x 20" platens. Large stock hydraulic presses 12" x 12" to 48" x 48" platens. Hydraulic Pumps and Accumulators. Hartig 3½" Extruder also 1½" to 4½". Rotary Cutters. Stokes Molding Presses. Single-Punch & Rotary Preform Machines. Banbury Mixers, Crushers, Churns, Bale Cutters, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 107—8th Street, Brooklyn 15, N. Y. STerling 8-1944.

FOR SALE: MARCO PROCESS CONSISTING OF: KACR Reactor, Kom-Bi-Nators, Homogenizer, Roto-Feed Mixers, proportioners, etc., all stainless steel. Double-arm sigma blade jacketed Mixers: (2) Read 50-gal. 30 HP; (2) W & P 100 gal.; (2) Day 75-gal. st. st.; (1) Banbury size 3; Kux model 25 rotary pellet presses 21 and 25 punch. (7) Devine Vacuum Shelf Dryers #17, #23, #27. WE BUY SURPLUS EQUIPMENT. PERRY EQUIPMENT CORP., 1424 N. 6th St., Phila. 22, Pa.

FOR SALE: PATENTED SAFETY RUBBER HEEL AND SOLE MOLD with three patent claims allowed. Will give longer wear for economy will minimize fatigue because it is shock absorbing and safe on wet and slushy pavement, at no extra cost. Can be used to good advantage on rubber boots and footwear. Can be only one best sole and heel, and this is it. Permit us to prove this to your advantage. JOHN A. MASELTER, 2149 Leland Avenue, Chicago 25, Ill.

FOR SALE: 2—FARREL 40" REBUILT MILLS; 1—TAYLOR-Stiles Giant Rubber Cutter; 1—6" x 12" Laboratory Mill, m.d.; 1—Ball & Jewell Rotary Cutter, size O, m.d.; 1—Farrel 12 x 24" Heavy-Duty Mill; also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters. WANTED: Your Surplus Rubber Machinery. CONSOLIDATED PRODUCTS CO., INC., 64 Bloomfield St., Hoboken, N. J. HOboken 3-4425; N. Y. Phone: BArclay 7-0600.

HOWE MACHINERY CO., INC.
30 GREGORY AVENUE PASSAIC, N. J.
Designers and Builders of
"V" BELT MANUFACTURING EQUIPMENT
Card Latering, Expanding Mandrels, Automatic Cutting, Skiving, Flipping and Roll Drive Wrapping Machines.
ENGINEERING FACILITIES FOR SPECIAL EQUIPMENT
Call or write.

Clays (*cont'd*)			
Paragon	ton	$13.50	/ $31.50
McNamee	ton	13.50	
RX-43	ton	33.00	
Recco	ton	14.00	
Sno-Brite	ton	12.50	
Stan-Clay	ton	28.00	
Stellar-R	ton	50.00	
Suprex	ton	14.00	/ 32.00
Swanee	ton	12.50	
Windsor	ton	14.00	/ 30.00
DC Silica	lb.	1.45	/ 1.65
Diatomaceous silica	ton	32.00	/ 48.00
Flocks			
Cotton, dark	lb.	.095	/ .135
Dyed	lb.	.55	/ .60
White	lb.	.13	/ .33
Fabrifil X-24-G	lb.	.135	
X-24-W	lb.	.235	
Filfloc 6000	lb.	.33	
F-40-900	lb.	.135	
HSC #35 Silicone Emulsion	lb.	1.22	/ 2.46
Kalite	ton	50.00	/ 65.00
Lithopone, comml	lb.	.075	/ .085
Albalith	lb.	.075	/ .085
Astrolith	lb.	.063/4	/ .0675
Eagle	lb.	.0725	/ .075
Sunolith	lb.	.075	/ .0825
Mica Concord	lb.	.075	/ .0825
Millical	ton	38.00	/ 53.00
Mineralite	ton	40.00	/ 60.00
Non-Fer-Al	ton	32.50	/ 47.50
Purecal	ton	56.75	/ 71.75
Pyrax A	ton	13.50	
W. A	ton	16.00	
Sawdust	ton	14.00	/ 35.00
Silversheen Mica	lb.	.08	/ .09
StanWhite	ton	10.50	/ 13.10
Super-White Silica	ton	23.00	/ 43.00
Surfex	ton	37.50	/ 52.50
MM	ton	39.50	/ 54.50
Suspenso	ton	35.50	/ 50.50
Ti-Cal	lb.	.0675	
Valron estersil	lb.	1.00	
Walnut shell flours	ton	40.00	/ 80.00
Whiting, limestone			
Atomite	ton	30.00	
Calcite	ton	23.00	
Keystone	ton	16.00	
Laminar	ton	30.00	
Omya	ton	30.00	
Paxinosa	ton	11.00	/ 19.00
Snowflake	ton	17.00	/ 18.00
Stonelite	ton	9.00	
Witco	ton	8.50	
York	ton	9.50	

Finishes

Apex Bright Finish #5200-E	lb.	.25	
Rubber Finish	gal.	2.50	
Black-out	gal.	4.50	/ 8.00
Flocks, Rayon, colored	lb.	.90	/ 1.50
White	lb.	.75	/ 1.25
Also see Flocks, under Fillers, Inert			
Rubber lacquer, clear	gal.	1.00	/ 2.00
Shellacs, Angelo	lb.	.485	/ .7325
Vac Dry	lb.	.485	/ .57
Talc (*See Talc, under Dusting Agents*)			
Unidip	lb.	.15	/ .20
Wax, Bees	lb.	.68	/ .83
Carnauba	lb.	.57	/ 1.13
Monten	lb.	.27	
No. 118, colors	gal.	.86	/ 1.41
Neutral	gal.	.76	/ 1.31
Van Wax	gal.	1.45	/ 1.50

Latex Compounding Ingredients

Acintol D, DLR	lb.	.06	/ .075
FA #1	lb.	.065	/ .08
#2	lb.	.075	/ .09
Accelerator 552	lb.	2.25	
J-117, -302	lb.	1.00	/ 1.15
-144	lb.	.15	/ .30
-307	lb.	1.10	/ 1.25
-311	lb.	.60	/ .75
Aerosol, dry types	lb.	.39	/ 1.20
Liquid types	lb.	.40	/ .72
Alcogum AN-6	lb.	.05	
AN-10	lb.	.085	
Alrosol	lb.	.41	
Alrowet D-75	lb.	.63	
Amberex solutions	lb.	.1675	/ .18
Antifoam J-114	lb.	3.25	/ 3.45
P-242	lb.	.24	/ .35
Antioxidant J-137, -140	lb.	.55	/ .70
-139, -293	lb.	1.45	/ 1.60
-182	lb.	2.00	/ 2.15
-186	lb.	1.40	/ 1.55
2246	lb.	1.50	/ 1.53
Anti Webbing Agent J-183	lb.	.75	/ .90
-297	lb.	.27	/ .40
Aquablak B	lb.	.0925	/ .0975
G	lb.	.105	/ .11
K	lb.	.1075	/ .1125
M	lb.	.085	/ .09
Aquarex D	lb.	.78	
G	lb.	.21	
L. ME	lb.	.94	
MDL	lb.	.33	
NS	lb.	.60	
SMO	lb.	.50	
Areskap 50	lb.	.30	/ .38
100, dry	lb.	.60	/ .72
Aresket 240	lb.	.30	/ .38
300, dry	lb.	.60	/ .72
Areskiene 375	lb.	.42	/ .57
Ben-A-Gels	lb.	.98	/ 1.40
Bentone 18, 18C	lb.	$0.45	
34	lb.	.60	
Casein	lb.	.22	
Cellosize WP-09, -3, -40, -300	lb.	1.00	/ $ 1.17
CW-12	lb.	.85	
37	lb.	.70	
DC Antifoam A Compound	lb.	5.45	/ 6.65
Emulsion	lb.	2.05	/ 4.00
AF Emulsion	lb.	2.05	/ 2.85
Compound 7	lb.	5.13	/ 6.50
Defoama W-1701	lb.	.125	
Defoamer 115a	lb.	.50	
Dispersing Agents			
Blancol	lb.	.1525	/ .26
N	lb.	.155	/ .26
Darvan Nos. 1, 2, 3	lb.	.22	/ .30
Daxad 11, 21, 23, 27	lb.	.08	/ .30
Dispersaid H7A	lb.	.58	
1159	lb.	.43	
Empulphor ON-870	lb.	.50	/ .70
Igepal CO-630	lb.	.2875	/ .47
Igepon T-73	lb.	.285	/ .495
T-77	lb.	.45	/ .69
Indulins	lb.	.06	/ .08
Kreelons	lb.	.132	/ .155
Laurelton Oil	lb.	.18	
Leonil SA	lb.	.52	/ .65
Lomar PW	lb.	.18	
Marasperse CB	lb.	.1225	/ .1425
N	lb.	.095	/ .105
Modicols	lb.	.17	/ .58
Nekal BA-75	lb.	.395	/ .54
BX-76	lb.	.63	/ .75
Pluronics	lb.	.335	/ .40
Polyfons	lb.	.08	/ .09
Sorapon SF-78	lb.	.28	/ .40
Tergitol NPX	lb.	.275	/ .3074
TMN	lb.	.2875	/ .32
7	lb.	.4125	/ .44
Trenamine	lb.	.15	
Triton R-100	lb.	.12	/ .25
X-100, -102, -114	lb.	.255	/ .36
Dispersions			
AgeRite Alba	lb.	3.00	
Powder, Resin D	lb.	.80	
White	lb.	1.80	
Altax	lb.	.75	
Black No. 25	lb.	.22	
Shield Nos. 2, 6	lb.	.08	
3	lb.	.095	
4-35	lb.	.09	
5	lb.	.093	
7-F, 8	lb.	.165	
55	lb.	.18	
Iron Oxide, 60%	lb.	.40	
L.S.W.	lb.	1.50	
No. 305 Liquizinc	lb.	.30	/ .35
P-33	lb.	.35	
Rayox	lb.	.45	
Rotax	lb.	.75	
Sulfur	lb.	.12	/ .30
No. 2	lb.	.14	/ .16
Telloy	lb.	3.00	
Tuads, Methyl	lb.	1.60	
Vulcanizing, C group	lb.	.40	/ 1.30
G group	lb.	.45	/ .90
N group	lb.	.40	/ 1.00
Zetax	lb.	.75	
Zimates, Butyl	lb.	1.30	
Ethyl, Methyl	lb.	1.35	
Zinc oxide	lb.	.40	
Emulsions			
AgeRite Stalite	lb.	.75	
Habuco Resin Nos. 502, 515, 523	lb.	.195	/ .20
503	lb.	.22	/ .225
504, 526	lb.	.19	/ .195
517	lb.	.175	/ .18
524	lb.	.155	/ .16
Resin A-2	lb.	.16	/ .25
P-370	lb.	.175	/ .25
X-210	lb.	.12	/ .22
Freeze-Stabilizer 322	lb.	.40	
12116C	lb.	.52	
Gelling Agent P-397	lb.	.34	/
Igepon T-43	lb.	.145	/ .35
T-51	lb.	.125	/ .285
-73	lb.	.285	/ .495
Indulins	lb.	.06	/ .08
Ludox	lb.	.1675	/ .195
Marmix	lb.	.41	/ .48
Merac	lb.	.75	/ 1.05
Micronex, colloidal	lb.	.06	/ .072
Monsanto Blue 4685 WD	lb.	1.60	
Green 4884 WD	lb.	1.80	
Red 127	lb.	1.25	
OPD-101	lb.	.16	/ .26
Pliolite Latex 150, 190	lb.	.32	/ .41
170	lb.	.37	/ .46
Polyvinyl methyl ether	lb.	.25	/ .45
Resin V	lb.	.13	
Roelgel 100C	lb.	.46	
Santomerse D	lb.	.44	/ .65
S	lb.	.13	/ .25
Sellogen Gel	lb.	.1275	
Sequestrene AA	lb.	.905	/ .975
30A	lb.	.245	/ .265
ST	lb.	.585	/ .615
Setsit #5	lb.	.75	/ 1.05
Stablex A	lb.	.80	/ 1.10
B, G	lb.	.50	/ .95
K	lb.	.27	/ .35
P	lb.	.35	/ .50
T	lb.	.14	/ .22
Surfactol 13	lb.	.345	/ .36
Webnix	lb.	1.50	/ 2.50

Mold Lubricants

Acintol D	lb.	.06	/ .075
A-C Polyethylene	lb.	$0.30	/ $0.37
Alipal CO-433	lb.	.25	/ .45
CO-436	lb.	.22	/ .41
Aquarex Compounds	lb.	.21	/ .94
Carbowax 200, 300, 400	lb.	.22	/ .25
1500	lb.	.255	/ .2825
4000	lb.	.31	/ .32
6000	lb.	.35	/ .36
Castorwax	lb.	.21	/ .27
Colite Concentrate	gal.	.90	/ 1.15
D-Tak Dip #10	gal.	1.50	
DC Mold Release Fluid	lb.	3.14	/ 4.75
Compound 4, 7	lb.	5.13	/ 6.50
Emulsion 7	lb.	1.59	/ 2.07
8, 35, 35A, 35B, 36	lb.	1.26	/ 1.80
200 Fluid	lb.	3.14	/ 4.75
ELA	lb.	.82	
FT Wax 200	lb.	.265	/ .42
300	lb.	.295	/ .45
Glycerized Liquid Lubricant, concentrated	gal.	1.48	/ 1.63
Igepals	lb.	.2875	/ .74
Igepon AP-78	lb.	.44	/ .68
T-43	lb.	.145	/ .35
-51	lb.	.125	/ .285
-73	lb.	.285	/ .495
Lubrex	lb.	.25	/ .30
Lubri-Flo	gal.	10.00	/ 12.05
Lustermold	lb.	.41	
Mold Paste	lb.	.25	
Monopole Oil	lb.	.16	
Monten Wax	lb.	.57	
Para Lube	lb.	.046	/ .048
Plaskon 8406, 8407	lb.	.30	/ .37
8416, 8417	lb.	.35	/ .42
8429	lb.	.40	/ .47
Pluronics	lb.	.335	/ .44
Polyglycol E series	lb.	.29	/ .42
Rubber-Glo	gal.	.94	/ .97
SM-33, -55, -61, -62	lb.	1.22	/ 1.76
Soap, Hawkeye	lb.	1.35	/ 1.45
Purity	lb.	.155	/ .165
Sodium stearate	lb.	.40	
Stoner's 700 series	gal.	1.20	/ 1.25
800 series	gal.	1.26	/ 1.70
900 series	gal.	1.55	/ 2.55
A Series	gal.	1.80	/ 4.50
Ucon 50-HB Series	lb.	.25	/ .375
Ulco	lb.	.12	/ .23
Vanfre	gal.	2.50	/ 3.00

Odorants

Alamasks	lb.	.75	/ 6.50
Coumarin	lb.	2.95	/ 3.55
Curodex 19	lb.	4.75	/ 5.05
188	lb.	5.75	
198	lb.	6.75	
Ethavan	lb.	6.75	/ 7.35
Latex Perfume #7	lb.	4.00	
Neutroleum Gamma	lb.	3.60	
Rubber Perfume #10	lb.	2.60	
Vanillin, Monsanto	lb.	3.00	/ 3.15

Plasticizers and Softeners

Acintol R	lb.	.065	/ .07
Adipol 2EH, 10A	lb.	.40	/ .435
BCA	lb.	.43	/ .455
ODV	lb.	.45	/ .485
Admex 710	lb.	.325	
711	lb.	.345	
744	lb.	.40	
Aro Lene #1980	lb.	.10	/ .12
Baker AA Oil	lb.	.195	/ .24
Crystal O Oil	lb.	.21	/ .255
Processed oils	lb.	.215	/ .235
Bardol, 639	lb.	.215	/ .235
B	lb.	.0625	/ .065
Benzoflex 2-45	lb.	.26	/ .29
9-88	lb.	.27	/ .30
Bondogen	lb.	.55	/ .60
BRC 20	lb.	.15	/ .175
22	lb.	.025	/ .0275
30	lb.	.0125	/ .021
521	lb.	.019	/ .02
BRH 2	lb.	.0213	/ .0351
BRS 700	lb.	.02	/ .0285
BRT 7	lb.	.03	/ .031
BRV	lb.	.0475	/ .0565
Bunarex Liquid	lb.	.0425	/ .0555
Resins	lb.	.065	/ .1225
Bunnatol G, S	lb.	.40	/ .505
Butac	lb.	.125	/ .135
Butyl stearate, comml	lb.	.255	
Binney & Smith	lb.	.23	/ .26
Hardesty	lb.	.23	/ .26
Ohio-Apex	lb.	.22	/ .255
BxDC	lb.	.40	/ .41
Cabflex HS-10	lb.	.44	/ .47
Califlux 510, 550	lb.	.025	/ .0325
G, P	lb.	.0125	/ .02
R-100	lb.	.045	/ .0525
TT	lb.	.017	/ .0245
Capryl alcohol, comml	lb.	.195	/ .235
Binney & Smith	lb.	.18	/ .28
Hardesty	lb.	.18	/ .28
Chlorowax 40	lb.	.1625	/ .1825
70	lb.	.185	/ .245
-S	lb.	.21	/ .27
Contogums	lb.	.0875	/ .111
Cumar Resins	lb.	.065	/ .17
DBM (dibutyl-m-cresol)			
Darex	lb.	.32	/ .3475
DBP (dibutyl phthalate), comml	lb.	.30	/ .33
Darex	lb.	.30	/ .33
Eastman	lb.	.30	/ .33
Hatco	lb.	.30	/ .33
Monsanto	lb.	.30	/ .33

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE:
1—ADAMSON UNITED HYDR. PRESS, 113 tons, 12" stroke; 12" up-moving ram; 24"x24" platens; cored for steam.
200 T. UP-ACTING TOGGLE #9 STANDARD PRESS, 24"x24" platens; complete w/roll feed & take-up mech., 5 HP.
1400 T. ADAMSON platens 150"x74", 10 openings 2¾"; eight 15" dia. rams; self-contained, new '42, like new.
8" NATIONAL ERIE EXTRUDER, dble. reduc. Herringbone dr., 100 HP, new '48, used on limited basis only. Very good.
COMPLETE RUBBER PLANT, includes rubber mill, extruder, conveyor for extruder, 3-roll calender, air compressor.
RUBBER MOLDS (125), for compression presses w/multiple cavities, such as car mats, hot water bottles, drain board trays, force cups, soap dishes, stoppers, sink strainers, stair treads, bath mats, etc. TERMS AVAILABLE, 30-DAY RETURN PRIVILEGE.
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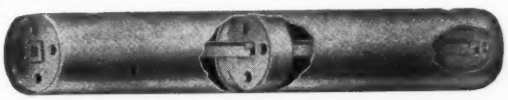
STEEL CALENDER STOCK SHELLS



ALL STEEL, ALL WELDED CONSTRUCTION, with forged steel hubs for 1¼", 1½" and 2" square bars. 4", 5", 6", 8", 10", 12", 15", 20" and 24" diameters. Any length. Also Special Trucks (Leaf Type) Racks, Tables and Jigs.

Used in manufacturing rubber and plastic products.

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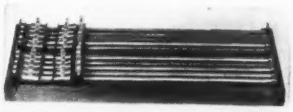
PERMANENT SET TEST EQUIPMENT
For Cold Tension Recovery Test
fulfilling Specification MIL-C 12064(CE).



This equipment is also a must to adequately control the production of compounds intended for wire coverings, rubber belting and tire carcasses.

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*Trademark

SCOTT TESTERS, INC.
90 Blackstone St., Providence, R. I.

RUBBER HARDNESS
ORIGINAL SHORE
DUROMETER
A-2 SCALE
(A.S.T.M. D676)
VARIOUS OTHER MODELS FOR TESTING THE ENTIRE RANGE
TECHNICAL DATA ON REQUEST

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JAMAICA 35, N.Y.

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Since 1891
L. ALBERT & SON
Trenton, N. J., Akron, Ohio, Chicago, Ill., Los Angeles, Calif.

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A Chronological Record of the Important Events in the History of Rubber

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Uncured Stocks
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DPB (*Cont'd*)		
Naugatuck	lb.	$0.30 / $0.33
Ohio-Apex	lb.	.30 / .335
PX-104	lb.	.30 / .33
Rubber Corp. of America	lb.	.30 / .44
Sherwin-Williams	lb.	.30 / .33
DBS (dibutylsebacate), comml	lb.	.66 / .69
Hatco	lb.	.66 / .685
Monoplex	lb.	.66 / .675
Naugatuck	lb.	.665 / .69
PX-404	lb.	.665 / .69
DPC (dicaprylphthalate), comml	lb.	.295 / .325
Hatco	lb.	.295 / .325
Monoplex	lb.	.30 / .315
DDA (didecyladipate)		
Cabflex	lb.	.425 / .455
Good-rite GP-236	lb.	.40 / .55
DDP (didecylphthalate)		
Cabflex	lb.	.305 / .335
Good-rite GP-266	lb.	.305 / .455
Hatco	lb.	.305 / .435
Defoamer X-3	lb.	.355
DIBA (diisobutyladipate)		
Cabflex	lb.	.4325/ .4625
Darex	lb.	.4325/ .4625
Eastman	lb.	.41 / .44
Ohio-Apex	lb.	.41 / .445
DIDA (diisodecyladipate)		
Monsanto	lb.	.425 / .455
DIDP (diisodecylphthalate)		
Darex	lb.	.32 / .35
Monsanto	lb.	.305 / .335
Ohio-Apex	lb.	.305 / .34
PX-120	lb.	.305 / .335
Dielex B	lb.	.06
Diethylene glycol, comml	lb.	.1525/ .1825
Wyandotte	lb.	.15 / .165
Dinopol IDO	lb.	.305 / .34
DIOA (diisooctyladipate)		
Cabflex	lb.	.425 / .455
Naugatuck	lb.	.435 / .465
PX-208	lb.	.425 / .455
Rubber Corp. of America	lb.	.425 / .56
DIOP (diisooctylphthalate), comml	lb.	.305 / .335
Cabflex	lb.	.305 / .335
Darex	lb.	.32 / .35
Eastman	lb.	.305 / .335
Hatco	lb.	.305 / .335
Monsanto	lb.	.305 / .335
Naugatuck	lb.	.305 / .335
Ohio-Apex	lb.	.305 / .34
PX-108	lb.	.305 / .335
Rubber Corp. of America	lb.	.305 / .45
Sherwin-Williams	lb.	.32 / .34
DIOS (diisooctylsebacate), comml	lb.	.61 / .64
Rubber Corp. of America	lb.	.61 / .84
DIOZ (diisooctylazelate)		
Cabflex	lb.	.48 / .51
Dipolymer Oil	gal.	.33 / .38
Dispersing Oil No. 10	lb.	.06 / .0625
DNODP (di-n-octyl-n-decyl phthalate), Monsanto	lb.	.345 / .375
DOA (dioctyladipate), comml	lb.	.425 / .455
Cabflex	lb.	.425 / .455
Eastman	lb.	.40 / .43
Good-rite GP-233	lb.	.40 / .55
Hatco	lb.	.435 / .465
Monsanto	lb.	.425 / .455
Naugatuck	lb.	.435 / .465
PX-238	lb.	.425 / .455
Rubber Corp. of America	lb.	.425 / .56
DOP (dioctylphthalate), comml	lb.	.305 / .335
Cabflex	lb.	.305 / .335
Darex	lb.	.32 / .35
Eastman	lb.	.305 / .335
Good-rite GP-261	lb.	.305 / .455
Hatco	lb.	.305 / .335
Monsanto	lb.	.305 / .335
Naugatuck	lb.	.305 / .335
Ohio-Apex	lb.	.305 / .34
PX-138	lb.	.305 / .335
Rubber Corp. of America	lb.	.305 / .45
Sherwin-Williams	lb.	.32 / .34
DOS (dioctylsebacate), comml	lb.	.61 / .64
Eastman	lb.	.61 / .64
Hatco	lb.	.61 / .635
Monoplex	lb.	.61 / .635
Naugatuck	lb.	.615 / .64
PX-438	lb.	.615 / .64
Rubber Corp. of America	lb.	.61 / .84
Drapex 3.2	lb.	.40 / .45
Dutch Boy NL-A10 (DBP)	lb.	.30 / .33
-A20 (DOP), A30 (DIOP)	lb.	.305 / .335
-A54	lb.	.295 / .325
-C20 (DOS)	lb.	.61 / .63
-F21	lb.	.395 / .425
-F31	lb.	.44 / .47
-F41	lb.	.48 / .51
Dutrex 6	lb.	.025 / .035
Emulphor EL-719	lb.	.52 / .73
Ethox	lb.	.43 / .455
Ethylene glycol, comml	lb.	.135 / .165
Wyandotte	lb.	.1325/ .1425
Flexol 3 GH	lb.	.44 / .46
3 GO	lb.	.53 / .55
4 GO	lb.	.325 / .355
10-A	lb.	.425 / .455
426	lb.	.27 / .30
810, 810X, 10-10, 10-10X	lb.	.305 / .335
TOF, A-26	lb.	.435 / .465
Flexricin P-1	lb.	.295 / .31
Flexricin P-4	lb.	$0.285 / $0.30
P-8	lb.	.305 / .32
PG-16	lb.	.335 / .35
Fortex	lb.	.125 / .145
G. B. Asphaltic Flux	gal.	.08 / .14
Naphthenic Neutrals	gal.	.11 / .18
Process oil, light	lb.	.025 / .0325
Medium	lb.	.035 / .0425
Galex W-100	lb.	.155 / .18
W-100 D	lb.	.1525/ .1775
Gilsowax B	lb.	.0975/ .11
Harchemex	lb.	.25 / .34
Harflex 10	lb.	1.25 / 1.335
40	lb.	.64 / .725
50, 80, 300	lb.	.58 / .665
60	lb.	.62 / .705
90	lb.	.88 / .965
120, 150	lb.	.305 / .395
Harflex 140, 160	lb.	.30 / .33
180	lb.	.295 / .38
220, 250	lb.	.425 / .515
260	lb.	.42 / .45
280	lb.	.42 / .51
500	lb.	.315 / .405
HB-20	lb.	.15 / .17
-40	lb.	.19 / .21
Heavy Resin Oil	lb.	.0225/ .0375
HSC-13	lb.	.27 / .30
Indonex	gal.	.11 / .19
Kapsol	lb.	.3225/ .3525
Kenflex A, L	lb.	.26 / .27
B	lb.	.23 / .24
N	lb.	.18 / .19
Kessoflex 103	lb.	.405
105	lb.	.3325
106	lb.	.38
107	lb.	.525
110	lb.	.24
111	lb.	.28
KP-23	lb.	.29 / .325
-90	lb.	.40 / .435
-140	lb.	.46 / .485
-201	lb.	.5825/ .5925
-220	lb.	.31 / .345
-555	lb.	.46 / .485
Kronisol	lb.	.33 / .365
Kronitex AA, I, K-3, Mx	lb.	.345 / .38
Marvinol plasticizers	lb.	.28 / .8825
Methox	lb.	.385 / .41
Monoplex S-38	lb.	.215 / .24
S-71	lb.	.45 / .475
Morflex	lb.	.25 / .65
Natac	lb.	.12 / .13
Neoprene Peptizer P-12	lb.	1.05
Nevillac	lb.	.31 / .85
Neville R Resins	lb.	.145 / .205
Nevinol	lb.	.24
No. 1-D heavy oil	lb.	.065
ODA (octyldecyladipate) Cabflex	lb.	.425 / .455
Good-rite GP-235	lb.	.40 / .55
ODP (octyldecylphthalate) Cabflex	lb.	.305 / .335
Good-rite GP-265	lb.	.305 / .455
Hatco	lb.	.305 / .335
Rubber Corp. of America	lb.	.305 / .45
Ohopex R-9	lb.	.3525/ .3775
Q-10	lb.	.295 / .33
Orthonitro benzophenol, comml	lb.	.13 / .15
Monsanto	lb.	.13 / .15
Palmalene	lb.	.15
Panaflex BN-1	lb.	.185 / .225
Para Flux, regular	gal.	.10 / .2125
No. 2016	gal.	.165 / .24
2332	gal.	.11
4205	lb.	.1075/ .2125
Para Lube	lb.	.046 / .048
Resins	lb.	.04 / .045
Paradene Resins	lb.	.07 / .08
Paraplex S-8	lb.	.29 / .3475
AL-111	lb.	.32 / .3275
G-25	lb.	.76 / .77
-40	lb.	.4825/ .51
-50	lb.	.39 / .4175
-53	lb.	.4325/ .46
-60	lb.	.325 / .35
-62	lb.	.345 / .37
RG-7	lb.	.33 / .335
-8	lb.	.505 / .5125
-10	lb.	.52 / .5275
Pepton 22	lb.	.79 / .82
Philrich 5	gal.	.11
Picco Resins	lb.	.135 / .195
480 Oilproof Series	lb.	.18 / .23
Aromatic Plasticizers	lb.	.05 / .065
Liquid Resin D-165 (V)	lb.	.06 / .075
(Z-3)	lb.	.07 / .085
(Z-6)	lb.	.08 / .095
S. O. S.	gal.	.29 / .34
Piccocizers	lb.	.04 / .055
Piccolastic Resins	lb.	.1855/ .34
Piccolyte Resins	lb.	.185 / .25
Piccopale Resins	lb.	.12 / .135
Piccovars	lb.	.165 / .20
Piccovol	lb.	.025 / .038
Pictar	gal.	.25 / .30
Pigmentar	lb.	.046 / .0745
Pigmentaroil	lb.	.046 / .0745
Pine Tar, Sunny South	lb.	.046 / .0801
Oil, Sunny South	lb.	.046 / .0801
Pitch, Burgundy, Sunny South	lb.	.1030/ .1085
Plasticizers		
42	lb.	.34 / .40
B	lb.	.35 / .45
DP-520	lb.	.435 / .455
MP	lb.	.035 / .0755
MT-511	lb.	$0.535 / $0.565
ODN	lb.	.32 / .37
SC	lb.	.54 / .63
Plastoflex #3	lb.	.52 / .57
#520	lb.	.36 / .435
DBE	lb.	.50 / .55
MGB	lb.	.29 / .37
SP-2	lb.	.43 / .48
VS	lb.	.3575/ .3075
Plastogen	lb.	.0775/ .08
Plastone	lb.	.22 / .3075
Polycin 470	lb.	.275 / .29
Polycizers	lb.	.40 / .545
Polymel D	lb.	.225 / .235
C-128	lb.	.1775/ .1875
D-TAC	lb.	.1975/ .215
DX, C-130	lb.	.1375/ .1475
PT67 Light Pine Oil	gal.	.60
101 Pine Tar Oil	lb.	.046 / .0634
Pine Tars	lb.	.046 / .0634
Reogen	lb.	.1325/ .135
Resin C pitch	lb.	.0225/ .031
R6-3	lb.	.38 / .40
Resinex 10, 25, 50, 110	lb.	.04 / .045
70	lb.	.0325/ .0375
85, 100	lb.	.035 / .04
115	lb.	.0375/ .0425
L-2, L-3, L-4, L-5	lb.	.0225/ .03
Rosin Oil, Sunny South	gal.	.58 / .875
RPA No. 2	lb.	.78
3	lb.	.47
Conc.	lb.	.97
5	lb.	.59
RSN Flux	gal.	.10 / .19
Rubber Oil B-5	lb.	.0225/ .0355
Rubberol	lb.	.2575/ .2725
Santicizer 1-H	lb.	.50 / .51
3	lb.	.46 / .47
8	lb.	.43 / .44
9	lb.	.39 / .42
140	lb.	.33 / .36
Santicizer-141	lb.	.34 / .37
160	lb.	.25 / .28
601	lb.	.325
602	lb.	.305
B-16	lb.	.4875/ .4975
E-15	lb.	.5075/ .5375
M-17	lb.	.4275/ .4575
Sebacic acid, purified, comml	lb.	.59 / .65
Binney & Smith	lb.	.64 / .76
Hardesty	lb.	.64 / .76
C.P.-Binney & Smith	lb.	.72 / .84
Hardesty	lb.	.72 / .84
Sherolatum Petrolatum	lb.	.05 / .10
Softener #20	gal.	.10 / .20
Special Rubber Resin 100	lb.	.1675/ .2175
Staflex AX	lb.	.43
DBES	lb.	.61 / .635
Syn-Tac	gal.	.33 / .35
Synthol	lb.	.2475
Thiokol TP-90B	lb.	.59
-95	lb.	.65
Tricresyl phosphate, comml	lb.	.33 / .36
Cabflex	lb.	.345 / .375
Monsanto	lb.	.33 / .36
Naugatuck	lb.	.33 / .36
PX-917	lb.	.33 / .36
Triphenyl phosphate, comml	lb.	.39 / .40
Monsanto	lb.	.39 / .40
Turgum S	lb.	.1075/ .1175
Tysonite	lb.	.24 / .2475
United	gal.	.69 / 1.20
X-1 Resinous Oil	lb.	.0225/ .0325

Reclaiming Oils

Acintol C, P	lb.	.02 / .03
Bardol, 639	lb.	.0275/ .0375
B	lb.	.0625/ .065
RRH 2	lb.	.0213/ .0351
BRT 3	lb.	.018 / .0265
4	lb.	.025 / .026
7	lb.	.03 / .031
BRV	lb.	.0475/ .0565
Burco-RA	lb.	.053 / .0805
BWH-1	lb.	.16 / .18
Dipolymer Oil	gal.	.33 / .43
Dispersing Oil No. 10	lb.	.06 / .0625
G. B. Oils	gal.	.10 / .24
Heavy Resin Oil	lb.	.0225/ .0375
No. 3186	gal.	.28 / .295
Picco 6535	gal.	.25 / .30
C-33	gal.	.215 / .315
-42	gal.	.23 / .33
D-4	gal.	.27 / .37
E-5	gal.	.25 / .35
Q-Oil	gal.	.286 / .36
PT 67	gal.	.60
101 Pine Tar Oil	lb.	.0427/ .0610
150 Pine Solvent	gal.	.44
Reclaiming Oil #3186	gal.	.28 / .385
G	gal.	.25 / .365
4039-M	gal.	.3275/ .3975
-V	gal.	.30 / .37
RR-10	lb.	.36
S. R. O.	lb.	.015 / .0225
X-1 Resinous Oil	lb.	.0225/ .0325

Reinforcers, Other Than Carbon Black

American Resinous Chemical		
978-42B	lb.	.18 / .19
1073-18B	lb.	.135 / .145
1294-36B	lb.	.115 / .125
1301-12B	lb.	.15 / .16

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Angelo Shellacs	lb.	$0.485 /	$0.7325
BRC 20	lb.	.15 /	.175
22	lb.	.025 /	.0275
30	lb.	.0125/	.021
521	lb.	.019 /	.02
Bunarex Resins	lb.	.065 /	.1225
Cab-o-sil	lb.	.68 /	.75
Calcene NC	ton	72.50 /	92.50
TM	ton	75.00 /	95.00
Calco S. A	lb.	.85 /	.88
Clays			
Aiken	ton	14.00	
Aluminum Flake	ton	22.25 /	60.00
Buca	ton	45.00	
Burgess HC-75	ton	12.00 /	30.00
HC-80	ton	14.00 /	32.00
Iceberg	ton	50.00 /	60.00
Pigment No. 20	ton	35.00 /	60.00
30	ton	37.00 /	60.00
Catalpo	ton	35.00	
Crown	ton	14.00 /	33.00
Dixie	ton	14.00	
Franklin	ton	13.50 /	35.25
L. G. B.	ton	17.00	
Paragon	ton	13.50 /	33.00
Pigment No. 33	ton	37.00	
Recco	ton	14.00	
Suprex	ton	14.00 /	33.50
Swanee	ton	12.50	
Whitetex	ton	50.00	
Windsor	ton	14.00 /	30.00
Witco No. 1	ton	14.00 /	30.00
No. 2	ton	13.50 /	30.00
Clearcarb	lb.	.1175/	.1255
Cumar Resins	lb.	.065 /	.17
Darex Resins	lb.	.42 /	.49
DC Silica	lb.	1.45 /	1.65
Diatomaceous silica	ton	32.00 /	48.00
Good-rite Resin 50	lb.	.39 /	.41
K Series Polymers	lb.	.15 /	.37
Hi-Sil 101	lb.	.10 /	.115
233	lb.	.09 /	.105
X303	lb.	.40 /	.45
Hycar 2001	lb.	.55	
2007	lb.	.39	
Indulins	lb.	.06 /	.08
Kralac A-EP	lb.	.43 /	.54
Laminar	ton	30.00	
Magnesium carbonate, Merck	lb.	.105 /	.12
Marbon Resins	lb.	.39 /	.46
Multifex MM	ton	110.00 /	125.00
Super	ton	160.00 /	175.00
Neville Resins			
465	lb.	.075 /	.08
LX-509	lb.	.33 /	.35
Nebony	lb.	.045 /	.05
Paradene	lb.	.07 /	.08
R	lb.	.145 /	.205
Para Resins 2457, 2718	lb.	.04 /	.4575
Parapol S-Polymers	lb.	.44	
Picco Resins	lb.	.13 /	.185
Piccolyte Resins	lb.	.205 /	.275
Piccoumaron Resins	lb.	.07 /	.19
Piccovars	lb.	.145 /	.20
Pliolite NR types	lb.	.98 /	1.33
S-3, -6	lb.	.42 /	.49
-6B	lb.	.39 /	.46
Purecal M	ton	56.75 /	71.75
SC, T	ton	110.00 /	125.00
U	ton	120.00 /	135.00
R-B-H 510	lb.	.15 /	.22
Resinex	lb.	.0325/	.0425
Rubber Resin LM-4	lb.	.28 /	.35
Silene EF	ton	120.00 /	140.00
Silvacons	ton	55.00 /	85.00
Witcarb R	ton	105.00 /	120.00
-12	ton	45.00 /	66.00
Zeolex 23	ton	120.00 /	140.00
Zinc oxide, commercial†	lb.	.135 /	.1775

Retarders

Benzoic acid TBAO-2	lb.	.44 /	
E-S-E-N	lb.	.35 /	.37
Good-rite Vultrol	lb.	.62 /	.66
R-17 Resin	lb.	.1075/	.36
Retarder ASA	lb.	.57	
J	lb.	.62 /	.64
PD	lb.	.35 /	.37
W	lb.	.45	
Retardex	lb.	.47 /	.50
Thionex	lb.	1.14	

Solvents

Bondogen	lb.	.55 /	.60
Butyrolactone	lb.	.60 /	.65
Cosol #1	gal.	.37 /	.43
#2	gal.	.42 /	.48
Dichloro Pentanes	lb.	.04 /	.07
Dipentene DD, Sunny South	gal.	.40 /	.62
Ethylene dichloride, comml.	lb.	.09 /	.1225
Hi-Flash 2-50-W	gal.	.41	
Pale yellow	gal.	.39	
LX-572	gal.	.27 /	.32
-748	gal.	.16 /	.23
n-Methyl-2-pyrrolidone	lb.	.75 /	.80
Neville Nos. 100, 104	gal.	.52 /	.60
106	gal.	.38 /	.46
Nevsolv H, 200	gal.	.19 /	.29
HF, T, 30	gal.	.24 /	.34
Penetrell	gal.	.40 /	.62
Picco Hi-Solv Solvents	gal.	.16 /	.48
Pine Oil DD, Sunny South	lb.	.1225/	.1425
PT 150 Pine Solvent	gal.	.44	
Skellysolve-E	gal.	.153	
-H	gal.	.133	
Skellysolve-R, -V	gal.	$0.109	
-S	gal.	.099	
Stauffer Carbon Disulphide	lb.	.0525/	$0.085
Tetrachloride	lb.	.0825/	.475

Synthetic Rubber Monomers

Dow Styrene N99, H99	lb.	.205	
RG	lb.	.17	
Vinyltoluene	lb.	.17	
Hylene T	lb.	1.15	
TM, TM-65	lb.	1.05	
Monomer MG-1	lb.	1.00 /	1.25
Rohm & Haas ethyl acrylate	lb.	.34	
Methyl acrylate	lb.	.37	
Methacrylate	lb.	.29 /	.31

Synthetic Rubber Shortstops

DDM	lb.	.75 /	.88
Mercaptan 174	lb.	.38 /	.50
Shortstop 204	lb.	.33 /	.37
268	lb.	.52 /	.53
Tecquinol	lb.	.825 /	.845
Thiostop K	lb.	.53	
N	lb.	.41	

Tackifiers

American Resinous Chemical			
A25, A26, 716-30	lb.	.18 /	.19
555-40R	lb.	.185 /	.205
620-32B	lb.	.20 /	.21
716-35	lb.	.17 /	.18
1041-21	lb.	.165 /	.175
Acintol R	lb.	.065 /	.07
Bardol, 639	lb.	.0275/	.0375
BRH 2	lb.	.0213/	.0351
Bunarex Resins	lb.	.065 /	.1225
Chlorowax 70	lb.	.18 /	.24
Contogums	lb.	.0875/	.11
Cumar Resins	lb.	.065 /	.17
Galex W-100	lb.	.155 /	.17
W-100D	lb.	.1525/	.1625
Indopol H-35	gal.	$0.65 /	$0.81
H-50	gal.	.70 /	.86
-100	gal.	.85 ▼/	1.05
-300	gal.	1.00 /	1.21
L-10	gal.	.40 ▼/	.56
-50	gal.	.45 /	.61
-100	gal.	.55 /	.71
Kenflex resins	lb.	.18 /	.27
Koresin	lb.	.90 /	1.10
Natac	lb.	.12 /	.13
Nevindene	lb.	.15 /	.18
Picco Resins	lb.	.13 /	.185
Piccolastic Resins	lb.	.1855/	.34
Piccolyte Resins	lb.	.185 /	.25
Piccopale Resins	lb.	.089 /	.13
Piccoumaron Resins	lb.	.07 /	.185
R-B-H 510	lb.	.15 /	.22
Roelflex 1118A	lb.	.39	
Synthetic 100	lb.	.41	
Synthol	lb.	.2475/	.2625
United	gal.	.69 /	1.20

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.60	
G-M-F #113, #117	lb.	.90	
Ko-Blend I, S	lb.	.39	
Litharge (*See Accelerator-Activators, Inorganic*)			
Magnesium oxide	lb.	.2525/	.38
Merck, Light Calcined	lb.	.2525/	.26
Extra Light Calcined	lb.	.2925/	.30
Red Lead (*See Accelerator-Activators, Inorganic*)			
Sulfasan R	lb.	1.50	
Sulfur flour, comml.	100 lbs.	2.30 /	3.05
Aero	100 lbs.	2.15 /	7.50
Crystex	lb.	.195 /	.23
Insoluble 60	lb.	.125 /	.13
Rubbermakers	100 lbs.	2.40 /	4.30
Stauffer	lb.	.024 /	.0515
Telloy	lb.	2.50	
VA-7	lb.	.50 /	.60
Vandex	lb.	15.50	
Vultac No. 2	lb.	.47 /	.755
3	lb.	.51 /	.795
White lead silicate (*See Accelerator-Activators, Inorganic*)			

CALENDAR of COMING EVENTS

July 27
Chicago Rubber Group. Golf Outing. Medinah Country Club, Medinah, Ill.

July 30-August 3
Gordon Research Conference of the American Assn. for the Advancement of Science. 1956 Conference on Elastomers. Colby Junior College, New London, N. H.

August 2
New York Rubber Group. Golf Tournament. Innis Arden Golf Club, Old Greenwich, Conn.

August 17
Philadelphia Rubber Group. Outing. Manufacturers Golf & Country Club, Oreland, Pa.

August 26-30
Natl. Assn. of Furniture Mfrs. Supply, Equipment & Fabric Fair. Conrad Hilton Hotel, Chicago, Ill.

September 8
Connecticut Rubber Group. Outing.

September 9-12
American Institute of Chemical Engineers. William Penn Hotel, Pittsburgh, Pa.

September 10-12
American Society of Mechanical Engineers. Fall Meeting. Denver, Colo.

September 16-22
American Society for Testing Materials, Pacific Coast Meeting. Los Angeles, Calif.

September 19-21
Division of Rubber Chemistry, ACS. Chalfonte-Haddon Hall, Atlantic City, N. J.

September 27
Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.

September 28
Chicago Rubber Group.

October 2
The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.

October 5
New York Rubber Group. Fall Meeting. Henry Hudson Hotel, New York, N. Y.

Boston Rubber Group. Fall Meeting. Hotel Somerset, Boston, Mass.

October 22-26
National Safety Council. Forty-Fourth National Safety Congress and Exposition. Chicago, Ill.
(Rubber Section, October 22-23.)

October 26
Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.

November 2
Chicago Rubber Group.

November 8
Rhode Island Rubber Club. Fall Meeting. Pawtucket Country Club.

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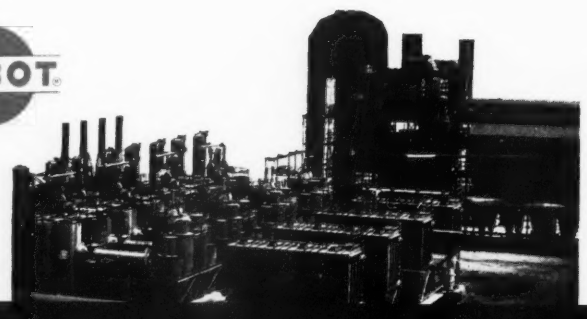

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